Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....$5.00
Canada 6.00
Foreign Countries (excepting daily editions)..... 8.00
Single Copies.....15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, $1; foreign, $2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,191 were mailed to regular paid subscribers to the weekly edition, 225 were provided for counter and news companies' sales, 1,049 were mailed to advertisers, exchanges and correspondents, and 285 were provided for new subscriptions, samples, copies lost in the mail and office use; that the total copies printed this year to date were 183,850, an average of 9,192 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

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Reclaiming Scrap Material

A railroad officer who had made a tour of inspection of the scrap reclaiming plants on various roads, when asked what impressed him the most, replied that the greatest benefit he had received was in learning what not to do. The reclaiming of scrap is a problem which requires the most careful study. What may be profitable for one road to reclaim may not be profitable for another. An enthusiast, and there are such men handling the reclamation of scrap, must be very careful not to be "penny wise and pound foolish." There are vast opportunities for making money in doing this work and there is also an excellent opportunity to overdo it. The overhead charges, as in no other class of work, must be carefully watched. An able and intelligent supervisor who can devote his entire time to the study of this problem will earn his salary many times over. It is a purely business proposition and it should be run on a business basis. It must be handled in the main for profit only, and in this respect it is different from the general run of railway shops where output is generally the controlling factor. The Railway Storekeepers' Association has been making a careful study of this subject and the report at its convention next week will be looked forward to with a great deal of interest.

Weaknesses of Railroad Advertising

We publish elsewhere parts of an interesting paper by Edward Hungerford on "Railroad Advertising," Mr. Hungerford criticizes the organization and methods used by railways generally in handling their advertising. On the whole his criticisms are justified. On most railways the advertising department is a mere appendage of the passenger department, and its chief function is to exploit the passenger service. Neither its location in the passenger department nor the use of practically all of its appropriation for exploiting passenger service is sound. There are numerous purposes besides that of exploiting the passenger service for which advertising could be effectively used, and if this were done the business of the railways and their relations to the public would be improved. The railways have a great deal more freight traffic than passenger traffic and their freight service is relatively profitable, while their passenger service is relatively unprofitable. Why spend so much money in advertising the least profitable part of the business and so little in advertising the most profitable part? Within recent months railways in various parts of the country have used advertising extensively to present to the public facts regarding the inadequacy of their earnings and the unreasonableness of certain kinds of legislation, such as that for the limitation of the length of freight trains and for unnecessary men in train crews. There can be no doubt that this advertising has tended to create a more intelligent and fair public sentiment regarding railway matters. There are so many good uses that can be made of advertising that it is a pity its principles and possibilities are so little understood in the railway business.

Battle of the Cost Accountants

It is perfectly easy to ascertain what it costs to render any particular railway service. At least, so we have been told for years by a certain class of professional critics of railways. The reason, according to these people, why the roads have not developed a system of cost accounting as a basis for making rates is that they have wanted to surround the traffic manager's job with an atmosphere of mystery in which he could work his will at the expense of his customers. But when self-confessed "experts" employed by the packers and other shippers and their willing coadjutors, the western state railroad commissions, attempt to analyze the costs of handling different kinds of traffic, the results of their calculations seem to depend entirely on what they want to prove. Four cost accountants, three of whom were employed by the state commissions and the shippers, and one by the Interstate Commerce Commission, testified before Commissioner Daniels at Chicago recently, and each of them succeeded in establishing an entirely different cost of handling each of the commodities regarding the rates on which they testified. Each of these "experts" also succeeded, of course, in showing that the methods used by each of the other "experts" in arriving at his results were entirely wrong. If this had been a battle between cost accountants employed by the railways on one side and the shippers and their humble servants, the state commissions, on the other, it might have been understandable, but the inability of even one side to get its "experts" to come anywhere near agreeing shows the stage of development that railway

cost accounting is still in. As long as "experts" of this class continue to thus disagree it is to be feared rates must perforce continue to be based on the unscientific and despised principle of "what the traffic will bear." This fiasco shows how much easier it often is to fulminate against those who act on unscientific principles than it is to formulate scientific principles for them to act on.

THE STUDENT IN THE RAILWAY BUSINESS

A LARGE majority of the higher officers of American railways have risen from the ranks without the advantage of college education and training. In many cases they have not even gone through high school. There is, in consequence, a widespread impression that the knowledge and mental discipline which can be obtained by study is of no advantage, or may really be disadvantageous to one who seeks to rise in railway service. No impression could be more entirely wrong or more adapted to be harmful to the ambitious young men in the service. There is no better educated class of men in the United States than the higher officers of our railways, and a large part of the education of the most "practical" of them has been derived from the study of the literature of their business. This needs to be emphasized for the good of the young men in the service and for the good of the roads themselves, for the need of the roads for officers who know both all that can be learned about their business from practical experience and all that can be learned about it by study, constantly exceeds the supply.

In the first place, the number of college men who have made successes in the railway service is large in proportion to the number of college men who have entered it. Among the college men who within very recent years have been brought prominently before the public by their promotions to positions of great importance are Howard Elliott, who left the presidency of the Northern Pacific to become chairman of the New Haven; Fairfax Harrison, president of the Southern; Julius Kruttschnitt, chairman of the Southern Pacific, and Hale Holden, president of the Burlington. A college training is far from being a drawback in a railway career. It is a great help.

In the second place, there is hardly a high officer of an American railway who has risen without a college training who has not, nevertheless, been a student all his life. It is a great mistake to assume that the "self-made" leaders of the industry have learned all they know in their daily work. The greatest of all this class, James J. Hill, studied at a small academy but never went to college. But Mr. Hill did not quit studying when he left the academy. He is one of the most widely read men in any line of business or professional work in America. To mention other high railway officers who, without college training, have nevertheless become highly educated, would be invidious, because to mention some would be to discriminate against many others equally deserving of mention. The president of one of the large eastern lines, who started railway work as a track laborer and a fireman, says that the turning point in his career was reached when he read Wellington's work on "Economics of Railway Location." The detailed information, the scientific principles and the broad outlook of this book taught him there were many things he could learn from the printed page which he could not learn elsewhere, and from that time he has been a tireless reader of the literature of transportation and of the broad field of economics and industry.

The president of a large western railway not only reads almost everything published on the problems of transportation and industry, but buys and gives as Christmas presents each year to the officers of his road the best recent book he can find on these problems. He seeks thereby to cultivate the same studious habit among his subordinates which he has found valuable to himself. The chairman of another large western road subscribes to all of the economic journals and has them sent to his home address. The president of another great western trunk line is an omnivorous reader not only of books and magazine articles relating to railway and business matters, but also of newspaper clippings, and those who come in contact with him are often astonished at the completeness of his knowledge of everything that the press is saying about railways. A few days ago the presidents of three great railways met by chance. Their railways are all in the same territory. One might have expected that their conversation would have turned to the railway situation in their section. On the contrary, one of them, who carries as heavy responsibilities as any business man in the United States, opened the conversation with the question, "Have you seen Prof. Ripley's new book on 'Railroads'?"

The illustrations given are not exceptions to the rule; they are illustrations of the rule. If one could ascertain the amount and breadth of the study done by the officers of each rank in the railway business he would find that on the average the presidents are the hardest and broadest students of all.

It is not a mere coincidence that the higher officers of the railways usually are not only among the most practical men in the business, but also among the most studious. Broadly speaking, there are only two ways in which people learn. One is by experience and the other is by study, and the one is as indispensable as the other. The experience of others, if properly understood and utilized, is as valuable as one's own experience, and study of books, magazines, convention reports and so on, is the best means to get a broad knowledge of the experience of others in such concentrated form as to make it serviceable. The man who attempts to do an important class of work without appropriate previous experience will usually make a failure of it, however much he may have studied. But the man who relies entirely on his own experience as a means of preparation for higher duties will with almost equal certainty make a mediocre success or a complete failure. A book, or an article, may be written, or a paper edited by a so-called "theorist," but if he is skillful in bringing together the results of the experience of practical men, a reading of his writings will be helpful to the most practical.

Every once in a while you hear a man say that he "hasn't time" to read the literature of his profession. In 99 cases out of 100 such a man will never be promoted to a high position, and if he is will make a failure in it. It is not a coincidence that as a class the presidents of the railways are the hardest and broadest students in the business, because in most cases those who are presidents owe their promotions to the fact that they early learned the necessity of adding to the knowledge derived from their own comparatively narrow experience, the knowledge of the experience of others that can be gained only by broad reading and study. They do not study because they are presidents; but they are presidents largely because they have studied!

ENGINE MAINTENANCE AND FAILURES

THE cost per engine-mile of locomotive maintenance and the mileage per engine failure give the best indications of the economy of the operation of the mechanical department of a railroad. For several reasons, however, these items should not be used to compare the efficiency of the operation of mechanical departments of different roads. In the first place, the operating conditions will to a large extent affect the performance of the mechanical department, bad water, heavy grades and poor track having material effect on the condition of the power. Also, the class of power and the facilities provided for its maintenance will be a large determining factor. The best way to use these figures is to compare one year with another, making a careful analysis of them with a view of correcting the weak points. This will require a thorough study of the conditions on each individual road and will undoubtedly show where profitable investments may be made.

An excellent example of what has been accomplished by following this practice may be found on the Minneapolis, St. Paul & Sault Ste. Marie. The cost of locomotive maintenance per locomotive mile for the year 1914 on the Soo Line proper, that is,

excluding the Chicago division—the old Wisconsin Central—was 8.55 cents, with an average mileage per engine failure of 49,925 miles. Within the past nine years this road has increased its mileage per boiler failure from 9,250 miles in 1906 to 848,720 miles in 1914, notwithstanding the fact that a large part of the territory over which it operates has very bad water. The Chicago division, during 1914, operated at a cost of 5.87 cents per locomotive mile with a record of 50,608 miles per engine failure and 1,872,000 miles per boiler failure. This division, however, has good water. The year before this road, the Chicago division (Wisconsin Central), was taken over by the Minneapolis, St. Paul & Sault Ste. Marie (1908) it was operated with 550 engine failures. In 1914 the total number of failures was 105. In this case the mechanical department has been materially assisted by the introduction of modern power. The Soo Line, taken as a whole, made the best showing of any road owning over 75 locomotives in the matter of boiler defects reported by the Federal Bureau of Locomotive Boiler Inspection, having only 46 locomotives reported as defective out of 529 owned and 313 inspected, with none ordered out of service.

Attention is called to this performance to illustrate what can be done by carefully and effectively studying the problem of locomotive maintenance. The officers attribute their success to perfecting the organization and insisting on careful maintenance and rigid inspection.

NEW BOOKS

Railway Statistics of the United States for the Year Ending June 30, 1914. By Slason Thompson, director of the Bureau of Railway News and Statistics. 140 pages, 5½ in. by 8¼ in. Bound in paper. Published by the author at Chicago.

This is the eleventh edition of Mr. Thompson's annual volume of railway statistics, which is valuable because of the promptness with which it is issued, and because of the interesting character of the classes of information which it includes, such as the comparison with foreign roads and other facts not given in the publications of the Interstate Commerce Commission. The statistics of the essential features of railway construction, maintenance and operation are compiled from annual returns identical with those made to the Interstate Commerce Commission from 446 roads operating 245,894 miles of line, representing nearly 97 per cent of the mileage and fully 98 per cent of the total traffic of the railways in the United States. For previous years comparisons are made with the official figures of the Interstate Commerce Commission.

The railway statistics of the United States are given under the headings of mileage, equipment, employees and their compensation, capitalization, cost of construction, ownership, public service, earnings and expenses, taxes, damages and injuries, accidents and receiverships. The statistics of foreign railways cover 21 countries. An introductory chapter compares the railway progress in the two decades, 1894 to 1904, and 1904 to 1914, and also gives a very interesting analysis of the present situation of the American railways and their relation to government regulation. After showing the reduction in rates, and increases and expenses for the last 10 year period, however, Mr. Thompson shows that there is a brighter side to the railway situation in a number of signs that mark the tempering of the popular mind toward the transportation industry. In this connection he shows that numerically considered there was a practical balance between the number of decisions rendered by the Interstate Commerce Commission during the year for and against the carriers.

While there were 111 decisions dismissing complaints there were 112 decisions making reductions or allowing reparation, and 56 decisions permitting advances and 55 denying advances; also the percentage of decisions dismissing complaints, 49.8 per cent, is larger than for any year since the bureau began its analysis of decisions in 1909, and the percentage of decisions awarding reparation or reducing rates, 50.2 per cent, is the smallest for any year. Mr. Thompson points out, however, that the decisions permitting advances are the only ones affording permanent relief to the railways.

Letters to the Editor

A VICE-PRESIDENT IN CHARGE OF LABOR

WILMINGTON, N. C.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Railroad labor contracts are unlike anything pertaining to similar contracts in other industries. The farmers, the merchant and the manufacturer employ at a fixed rate per unit of time or output, making it necessary only to keep a record of the hours employed or the number of pieces manufactured in order to decide questions arising under the contracts in force. Also, in most cases labor employed by these classes of employers can be closely supervised. On a railroad the conditions are quite different. Labor is widely scattered, often entirely removed from those in charge, and the contracts are based not only on time and piece, but on combinations of both, resulting in such an intricate system that no one but a decided specialist is competent to pass intelligently on questions which arise.

Every railroad man who has anything to do with the supervision of transportation labor knows that a large part of his time is taken up by the adjustment and settlement of matters arising from misunderstandings or from ignorance of the company's labor agreements. In one case which came to the writer's notice a general manager estimated that 60 to 70 per cent of his time during a period of half a year was taken up in handling grievances with brotherhood committees.

So, then, a situation exists of which the unfortunate part is this: That the time of transportation and general officers which ought to be given to matters concerning the economical movement of trains, is given over in large part to the settlement of labor disputes, to the detriment of transportation matters as a whole. Nor can the situation be solved by having at hand subordinates well versed in pay schedule matters, for the reason that the men are generally unwilling to accept a settlement which goes against them until it has been reviewed by the highest officer to whom they can appeal.

This gives rise to the question, "Why not a vice-president in charge of labor?" A man of the proper temperament and a thorough understanding of the questions involved, it seems to the writer, could be of incalculable value to the present American railroad organization.

We have in our present organization men whose sole duty is to see that materials are obtained at the lowest possible cost consistent with good quality. It is a further duty of these men to see that such materials are used with the greatest economy possible. Why, then, is it not imperative, now that wage schedules and the entire relation of the company to its employees has become complex, to have a trained officer handle such relations, with a view to obtaining as much as possible for the money expended as is consistent with service and safety? Also, to see that the labor employed, even as the material purchased by the supply department, is used with the greatest economy; which, in the case of labor, is the same as saying developed to its highest efficiency. In 1913, the Bureau of Railway Economics tells us, the railways of the United States expended 2.16 billions of dollars for operation; of this 63.4 per cent was for labor and 36.6 per cent for material, a ratio of nearly 2 to 1. If, then, we have created a special department to care for material, why not organize a department to look after the purchase of labor, which we buy in so much larger quantities, and to develop it to its highest capability?

On a road having a vice-president in charge of labor any grievances arising among trainmen, shopmen or other employees, after being passed on once by the subordinate officer directly in charge, to the dissatisfaction of the man or men affected, would be immediately referred to this vice-president. He would proceed to meet the men and his ability and authority would enable

him to settle all matters which are adjustable; and this with a minimum of lost time, correspondence and friction. Some will object that questions will still be appealed to the president or higher. This is true, but on the other hand a vast deal of intermediate correspondence and delay, if not actual friction, will be eliminated, and it is believed that the right man in such a position could and would decide matters in such a way that the president need waste but little time in rallying to his support.

The office could be made a broad one, to the great benefit of the whole organization. For instance, besides the mere handling of disputes, this vice-president would be advised of every decision made by any lower officer in regard to labor differences. Classifying these he would be able to advise with the officer by whom the decision was made, and often, by the prevention of a repetition of some decision, avoid the establishment of a dangerous precedent.

His would be the one department charged with the keeping of a complete record of each employee as to: (*a*) date of employment; (*b*) rate of pay; (*c*) promotions; (*d*) discipline.

The heads of the relief and pension departments could, not unnaturally, be brought under his supervision. The fact of his having complete records of all employees would make this desirable, and the keeping of relief or pension records of an employee on the same card or in the same envelope with his service record would avoid duplication of work.

A vice-president with the duties suggested would find his time fully occupied. By taking over duties now performed by other men he would give those men more time to devote to strictly transportation work. This would result in a money saving far exceeding the cost of any salary which could justifiably be paid to such an officer. For, if a general manager, a general superintendent, or any transportation officer, because of press of his "labor" work, fails to properly supervise train loading, the accumulation of foreign cars, etc., he can in a short time cause a money loss which will many times exceed any possible cost of creating and maintaining such an office as is here outlined.

J. LOWELL WHITE.

WAGES OF ENGINEERS AND FIREMEN

FORT WORTH, TEX.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the award of the board of arbitration, in the controversy between the western railroads and the engineers and firemen, the minority report of members Burgess and Shea contains some wild assumptions and assertions that indicate they are bad losers, to say the least. The minority practically intimates that if the next demand is not granted, the two organizations will strike; they say that "this award settles nothing"; they refer to immense surplus earnings and dividends, also concealed assets, and demand increased wages as a share in these sums, disregarding the law of supply and demand for labor or any consideration of the value of the work, asking the same wages for oil-burning engines and mechanical stokers as for shovel-fired big engines.

If surplus earnings and dividends justify corresponding increases in wages, will the engineers and firemen work for less wages on the Wabash, Western Pacific, Frisco, Rock Island or other roads where there were deficits? Certainly not, the work is only worth its value.

They say that in 1914 the western railroads paid $43,000,000 in dividends on fictitious stock. In looking over the list of roads, parties to this arbitration, after you eliminate the roads that failed to pay any dividends, if you capitalize this $43,000,000 at 4.3 per cent, you have one billion for value of fictitious stock. Such assertions are reckless and vicious, and should be carefully and publicly denied and actual facts compiled and published.

They practically insist that there will be no peace until all their demands are granted. By their position they make it necessary and advisable to meet their demands with a stern refusal.

Employees in other departments need consideration, especially those that are unorganized.

The average earnings of enginemen are now about as high as the work is worth, even admitting it is hazardous, and the hazard can be reduced by spending more money on tracks and signals, although their vocation is far safer now than it was a few years ago, engines ride easier and hours are shorter.

The writer concedes that they should be well paid, even better paid than other classes of employees, but the time has now come for them to be content with their lot, under present conditions.

AVERY TURNER.
Receiver, St. Louis, San Francisco & Texas.

THE USE OF A HIGH FACTOR OF ADHESION

CHICAGO, ILL.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Referring to the inquiry "Why Use a High Factor of Adhesion in Steam Locomotives" on page 778 of the issue of April 9, I would suggest for your correspondent's consideration that the fact that it is customary to reduce the thickness of driving tires from 3½ in. to 1¾ in. by turning, and to bore out the cylinders to a diameter at least ½ in. greater than the new diameter, may throw some light on the adoption of a factor of adhesion which he considers unnecessarily high.

C. E. MILLER.

TORONTO, ONT.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

This subject, referred to on page 778 of the issue of April 9, was recently a matter of much concern on this road and at that time was thoroughly discussed by our mechanical department officers.

Speaking generally, it would appear that practically all new locomotives have been equipped with superheaters, brick arches and other appliances which tend to greatly increase the sustained capacity of the boiler. In superheater engines the steam is to some extent wire drawn in the superheater, hence the pressure at the beginning of the stroke may not be as high as in saturated steam engines, while, owing to the superheater, the mean effective pressure will be higher, thus insuring an appreciable reduction in slipping, which may be taken advantage of in the design of superheater engines. We have been operating superheater engines for more than five years, and the most successful freight engine we have was designed with a factor of adhesion slightly less than 4.5. We do not feel that this should be exceeded, at least for our requirements. Our Pacific type passenger locomotives have a factor of 4.3, with a boiler pressure of 170 lb.

It is difficult to discuss the subject without reference to some specific service, as we have found that where slow heavy freight service is concerned it is possible to reduce the factor to 4.1 and even less by increasing the boiler pressure. This practice has given excellent results. Many freight engines have been built with a factor as low as this, but when the tractive effort is greater than 25 per cent of the weight on driving wheels, there must be an abnormally good rail condition in order to realize the full power, which even then cannot be done unless a low speed is maintained.

It has been our practice to design locomotives for 170 lb. boiler pressure (the boilers being calculated for 200 lb. pressure), using a moderate factor of adhesion; this allows for increasing the boiler pressure and thus increasing the ratio between tractive effort and weight on driving wheels.

L. K. SILLCOX,
Assistant Mechanical Engineer, Canadian Northern.

BADGES FOR WELSH RAILWAY EMPLOYEES.—The Cardiff Railway Company has just issued to all members of its staff of military age, who are desirous of enlisting, but cannot be spared from the service of the company, a tastefully designed badge, indicating the fact that the wearer is engaged in important war work at home.

Aspects of the Financial Problem of the Railways*

Consideration of the Effect Which the Federal Reserve Act Will Have on Needs of Railways for New Capital

By H. P. Willis
Secretary of the Federal Reserve Board

The most fundamental fact in the present railway situation is, I believe, the demand for new capital. For reasons which are known to all and require no detailed discussion from me, the amount of capital invested in new transportation enterprises during the past few years has been insufficient. The mileage of the country has been increased only from 207,977 miles in 1903 to 249,802 miles in 1913. The railroads of the country, considering the difficulties under which they have had to work, have done well in maintaining their investment in plant equipment and facilities generally. It would be wrong, however, to believe that they have kept pace with the advancing development of the country in other directions. What the reason for this relative backwardness is, I shall not attempt to inquire in detail at the present time. Certainly the ten years last past have not been an encouraging time for railroads, nor have they been years during which the investor either was, or could be expected to be, eager and willing to put his funds into transportation enterprises.

Now suddenly a new factor has been added. A struggle of unprecedented violence has broken out in Europe, with the result of destroying enormous quantities of fixed and circulating capital. This destruction of capital has affected every department and branch of enterprise, and will continue to do so from now until the close of the struggle in which nearly all of Europe is engaged. Various estimates have been made from more or less trustworthy sources with reference to the actual destruction of wealth in the course of this world conflict. I do not believe that any of these estimates can be even approximately accurate. Yet we can, with entire safety, recognize that very vast losses are being inflicted upon the world from three sources—the actual physical destruction of forms of capital, the withdrawal of productive workers from employment, and the actual loss of these workers and their productive power in consequence of death on the battlefield or from injuries or disease. Much of these losses of capital is of a kind which cannot be measured in terms of money, and much of it can not be estimated or accurately stated.

What we do know is that when the close of the war shall have been reached, however it may turn out, there will be a very great demand for capital to be used in the upbuilding of industries and in the restoration of those objects of use and production which have been so widely and so ruthlessly destroyed. The natural effect of this shortage of capital will be an increase in the rate of interest, with corresponding competition among those who wish to use capital for the purpose of carrying on business. This demand for capital will be a demand for long-term investment funds, not for money. However it may be masked by temporary circumstances, it will be a real thing involving the readjustment of supply and demand of the means of production. Such readjustment can be had only through an adaptation of methods of production and alteration of the prices charged for the use of the capital in question.

I know that there are some thinkers who believe that, owing to depression there will be a period in which demands for capital will be slack, and the rates of interest low. Whatever temporary force there may be in such a view as applied to short periods, it cannot, in the nature of the case, hold over the long-term operations involved in the process of restoring and rebuilding the business of the world. To restore the lost shipping, to replace railway lines, to rebuild factories and generally to put the world where it was before the opening of the struggle as regards productive facilities, with be the labor of a long period. While this is proceeding, other enterprises throughout the world will have to bear their share of the burden. They cannot, if they would, escape the fact that the new capital they need is urgently desired by others who would be willing to pay for it at high prices.

Thus, the railways, which are among the greatest borrowers of capital in every country, must, in the nature of the case, in common with other industries, find themselves hampered and crippled by anything which stands in the way of their obtaining the resources they require. They are confronted by a peculiar problem because of the practice which has arisen in recent years of financing their necessities in no inconsiderable degree on a short-term basis. We do not exaggerate, therefore, when we say that the capital problem of the railways was serious before the war, that it had been made particularly serious by the practice of short-term borrowing, and that the war itself has now placed the roads in an unprecedented position.

THE FEDERAL RESERVE ACT

While the situation is thus one which presents difficulties worthy of the attention of the best financiers, in so far as the acquisition of capital is concerned, there is a second factor in the situation that deserves very careful consideration, both from the standpoint of what it will do to influence conditions, and of what it will not do. This is the change that has come about in our banking system. Little more than a year ago congress passed the Federal Reserve Act. This act provides for the creation of banks of rediscount whose function it is to make banking resources fluid, and by that means to render capital active in a degree never heretofore possible. I do not exaggerate in the least when I say that this act holds out the greatest promise to business enterprise that has been offered to it for many years.

If the business community contents itself with simply continuing its present methods of operation, it will derive great advantage from the law. It will find (1) that local banks will be able, by rediscounting the paper of local enterprises, to provide the funds needed by such enterprises in their commercial transactions; (2) that there will be no such wide fluctuations of interest rates either geographically or from season to season as now exist; (3) that there will be no necessity of emergency measures to safeguard the country from the possible results of financial panic or stringency. Credit will be more simply available, cheaper, and more equitably open to all.

Not the least of all the advantages to the business man will be found in the provisions with respect to bank examinations, since through these, it may be hoped, many operations which have been open to criticism in the past will be clearly detected and corrected before they have had time to impair the vitality of institutions which might otherwise have continued sound and solvent. This is equivalent to saying that, under the new law, credit, even if there be no change in business methods, will be cheaper and more evenly diffused

*From an address before the fifth annual banquet of the Railroad Men's Improvement Society, New York, February 6, 1915.

as well as more steady and more certainly to be counted upon by those who do business by acceptable methods. But the community will not gain the greatest advantage from the measure if it adheres merely to established types of operation. The new act provides for the creation of a thorough discount market, such as has existed for many years in every European country. This means that every merchant of established local credit may in the future count upon a free sale for his paper throughout the reserve district in which he is situated, and to a somewhat lesser degree generally throughout the country.

The rediscount principle, when fully worked out, taken in connection with the use of the acceptance system, limited though it be to foreign trade transactions, will enable the sound, even though small, manufacturer or trader to get the advantage of the best rates of commercial credit that prevail anywhere within his region of the country. If there is capital to spare—unemployed and seeking occupation—he may expect that, through the general sale of bills under the new system, such capital will be available for the purchase of his paper, and will be so employed. By the judicious use of the acceptance privilege, now for the first time given to national banks, the local bank will be enabled to facilitate the movement of goods into and out of the country, and will at once make the utmost of its own capital, and at the same time enable its clients to gain the widest employment for their resources. The net result of these various influences should be (1) considerable reduction in average rates of interest on commercial paper throughout the United States; (2) very great reductions in the rates in certain sections remote from commercial centres; (3) stability and certainty in distribution of credit; (4) creation of new and more convenient types of paper.

SHORT TIME FINANCING

But while the act will be of enormous advantage to the business world, and through it to every productive, agricultural and industrial enterprise, it is not well for any thinker on the subject to mislead himself into the belief that such legislation will do the impossible. The Federal Reserve Act is not a measure which has to do with long term investment of capital, and those who look to it as a direct means of relief for manufacturing enterprises, like those who look to it as a means of providing agricultural resources, must inevitably be disappointed. Their disappointment will be based not upon the lack of results, but upon the fact that these results will be different, and will be exhibited in a way at variance with that which they had expected. It is worth while for me, therefore, to explain with some care, the relation of the Federal Reserve act to this question of longer term borrowing.

Much has been said of the effect of the Federal Reserve Act in furnishing an elastic currency, and in converting good commercial paper into immediate means of payment through rediscount operations. It was natural that the first attention of the public should be centered upon this subject, since it, above all others, has for many years past seemed to constitute the crux of banking operation. I would not for an instant minimize the importance of what has thus been done; indeed, I regard it as the fundamental purpose of the act. There is, however, much to be said of the effect of the Federal Reserve Act in other directions. One of these neglected phases of the subject relates to the influence of the new law in bringing about a readjustment of the rates of interest upon paper of varying maturities. The Federal Reserve Act specifically limits the paper which is rediscountable by member banks, as well as that which is purchasable in the open market, to notes and bills running not over 90 days, except in those cases where the paper is drawn to finance agricultural transactions, when the limit is extended to six months.

The act, however, wisely gave to the banks the power of regulating rates of discount on a different basis for shorter and for longer term paper; and to the Federal Reserve Board the power to approve such varying rates. It, moreover, permitted a variation of rates as between different sections of the country, so that both a time and a geographical variation were sanctioned. This was an important advance as compared with previous plans for the reformation of the banking system. Under the older plans it had been intended to create a rate of discount which would be uniform throughout the country; while such plans usually contemplated the rediscount only of very short term paper. The Federal Reserve Act was more carefully adjusted to conditions in that it recognized that much of the business of the United States is done on a relatively long period of credit; and that the fact that this period of credit is longer in some cases than in others, in no sense means that the paper is not liquid, and that it is practically certain to be redeemed at maturity, notwithstanding that the maturity is postponed.

The effect of the Federal Reserve Act, then, is to establish a series of maturities, some longer and some shorter, and to permit the placing of different rates of discount on these maturities. This is an idea of great importance. It is not a novel idea, because every well managed bank of large capital and great scope of operation endeavors to apply this policy. But it is of greater importance than ever before for the reason that the Federal reserve banks, owing to their ability to discriminate carefully between different classes of paper, will be able to make effective the discrimination they introduce into the rates applicable to different maturities of commercial paper. Inasmuch as they stand ready to take very short term paper in very large amounts at an unusually low rate of discount, they tend to emphasize the desirability of making obligations run for as short periods as practicable, since, the longer an obligation runs, the higher the rate of interest to be paid on it.

In other words, the Federal reserve banks are rendering to the commercial community the useful service of emphasizing the time element as compared with the mere element of safety in commercial paper. They will place a premium upon good short term commercial paper, and they will tend, so far as practicable, to discourage the financing of long term obligations through commercial capital except in those cases where the borrower is able to pay a relatively high rate of interest because of special conditions under which his product moves to market. The theory upon which the whole act is based, indeed, tends to place stress upon the view that very long term obligations, no matter how safe they may be, cannot be financed through the commercial banks at low rates, and that they are not as appropriate a medium for investment of funds as are the much shorter term maturities already referred to.

THE RAILROADS AND THE BANKS

The principle thus recognized has a most important bearing upon the conditions under which many enterprises are financed. It is true that within recent years railroads and other industrial enterprises have turned in many cases to the banks for the purpose of getting accommodation, and the banks have financed them upon the basis of short term notes, such notes running one, two, three or more years. That these notes have borne relatively high rates of interest has been a natural, not to say inevitable, incident in the situation; and the roads have been obliged to bear the brunt of the resulting expense. In other words, they have placed themselves in the position of long term commercial borrowers at banks. Under the new system they will be no more favorably situated than under the old; indeed, the fact that they are borrowing practically on the basis of long term commercial borrowers, will be emphasized.

The commercial banks will inevitably find themselves more and more inclined to keep their assets invested in paper

and obligations which do not exceed the maturities mentioned in the Federal Reserve Act; or if, for purposes of investment they place a part of their funds in long term obligations, they will take this step simply for the sake of convenience. They will be inclined to discourage the carrying of borrowers who are really seeking for additional capital; and they will tend more and more to convert their holdings of such borrowers' paper into short term commercial paper. They will tend more and more to adopt this policy as time goes on, and as the supply of commercial paper in new forms makes it more adequate to the needs of the situation. The carrying of such short term obligations will, therefore, tend to drift more and more into the hands of purely investment bankers, and they will need to establish a regular and steady flow of the securities into the hands of the public. Within recent years many banking institutions have become large investors in notes running from one to five years. The safety of the obligations is doubtless assured, but they are not strictly banking investments.

The direct inference from what I have said is a thought which has often been suggested within the past year or two in well informed quarters, but which has never been emphasized so positively as today. This is that above all things else it is imperative to facilitate the funding of railway obligations into long term securities, and to place these securities in the hands of the public. What the railroads seek to obtain through the issue of securities is capital for extending their equipment and mileage, and for generally enlarging their investments in fixed forms. The railroad is not in the position of a commercial borrower; and the obligations which take the form of bonds or three year notes, have no such relation to current services and payment therefor, as is the case with paper issued by commercial firms, corporations or individuals. It has long been a familiar fact that the best rates of interest and the most favorable terms were obtained by giving to railroad securities a reasonably long maturity; and it has been equally obvious that the credit of railroads was best safeguarded and the stability of their funded indebtedness was most strongly assured when the securities were widely distributed, and their bonds held by actual bona fide investors who bought them because they sought a safe means of investment for their funds, and intended to hold them because of the income producing power of the securities.

From all standpoints, then, and for all reasons, it is most urgent that the commercial banks of the country should be enabled to relieve themselves of the load of short term obligations representing investments in fixed capital, which they are now carrying. It is not possible to state the amount of such securities which appear among the assets of the banks, national, State and private, but it is large. This sum of values held by banks does not represent commercial banking operations, and will no doubt be gradually eliminated from the banks' assets and added to individual assets. It should not, in so large a measure, at least, continue to figure as a part of the commercial banking resources of the nation. To bring about this change does not imply any reflection on railroad credit; but, on the contrary, must be the outgrowth and most marked success of an effort to strengthen it.

THE PUBLIC AND RAILROAD SECURITIES

How can the public be induced to take up these securities, thus relieving the banks of the necessity of carrying railroad and similar securities, and to hold them firmly and permanently that they may constitute an indefinite investment in the railroads of the country, and may enable the roads to get the advantage of reasonable rates of interest at the same time that they are given the knowledge that they will not be disturbed by any necessity of refinancing themselves at short intervals? The answer to this question can be furnished by making the securities of railways more attractive to, and more popular with investors, and consequently by producing a stronger and more continuous demand for them.

Many persons seem to suppose that the placing of the securities with the public in the way I have indicated necessarily means the raising of interest thereon. This by no means follows. The small investor does not seek a high rate of interest so much as absolute security. He feels absolutely secure when he finds that the railroad which has issued the bonds he buys is earning a revenue sufficient to take care of the interest upon its obligations. In proportion as this revenue is adequate, the safety of the investment is assured; in proportion as safety is assured, rates of interest decline; in proportion as rates decline, the life of the investment can be lengthened. The situation is the exact reverse of that existing with respect to commercial paper, inasmuch as the rate of interest is primarily a matter of safety and long life; whereas in commercial paper the rate is the outgrowth of prompt maturity and certainty of liquidation. Certainty of liquidation is analogous to safety of investment, but far from being identical with it. There is nothing to be gained and much to be lost from attempting to identify the two factors. They should be sharply differentiated from one another; and it should be recognized that conditions which control rates of interest on commercial loans are far from being the same as those which control rates of interest on capital investment.

I have thus described to you some of the fundamental principles of the Federal Reserve Act in its relation to a phase of the banking problem which has received relatively little discussion. I have not attempted to indicate what is the relation of the new banking system to the question of interest rates on long term loans, and yet I think I should, perhaps, say a few words on that point. It should be understood that while, as I have attempted to explain, there is no necessary connection between the rates on short term obligations and notes or bonds running over a period of years, there is, nevertheless, an important relationship between the amount of capital or financial energy required to carry on the banking system of the country and the amount of such energy required for the support of long term operations.

The Federal Reserve Act is essentially a means of economizing the country's gold supply and its credit resources. When fully developed, the act may be expected to set free a considerable amount of capital which has heretofore been needed to carry on short term operations. That is to say, by reason of the fact that short term operations have been provided for on a smaller basis of outlay than in the past, a considerable amount of capital employed in financing these operations will be set free, and will thereby be enabled to go into the long term or investment field.

In so far as this release of capital is effective, it will tend to improve conditions in the general money market, and to lower rates of interest prevailing there. It will, moreover, do an even more important thing than this. By helping to make the line of division between short term and long term undertakings clear-cut and well defined, it will relieve the long term borrower of many incursions into his general field of capital investment from which he now suffers. The effect should be a decidedly more stable and probably a lower rate of interest than would be established without this factor. This in itself will be of very great value to the legitimate borrower who may wish to place securities on the market.

Both of these factors are, however, of that slowly working and conservative kind that figures but little in current discussions of such subjects, and that receives only passing attention from the casual student. They will require a considerable period for their complete development, and when they have been fully applied it will still remain true that the financial problem of the long term investor is essentially dependent upon the demand and supply of capital and in its prac-

tical working out, upon the question what he can offer to the public.

In the case of the railway this becomes a serious matter. As a result of the legislation, with which we are all familiar, intended to control transportation rates, our railroads have become far more stereotyped in practice than formerly. They do not venture to reduce a rate in the hope of stimulating business because they recognize that once reduced, a rate can only with great difficulty be advanced. The railways, whatever the stabilizing influence affecting the rate of interest may be, will, therefore, always have to meet the question whether they can provide the actual net resources that are necessary to take care of their fixed obligations. Undoubtedly the recent advances granted by the Interstate Commerce Commission will be of some service. But will the railroads be permitted to retain those advances? Will public opinion allow the roads to keep for themselves the fruits of these higher rates? Will organizations of employees regard the rates as only a basis for increased wage demands to be taken from the roads as soon as they can by arbitration or other methods, succeed in absorbing them?

A QUESTION OF EDUCATION

This is not a financial problem, it is a question of popular attitude and education. But the problem is financial in this sense: Up to date the railroads have been too largely dependent upon banking institutions for the financing of their obligations. The time has come when the public must be induced and expected to take over these obligations and to carry them as investments. If they cannot or will not do this, then the financial problem of the railroads is truly a serious one. It is undoubtedly a fact that the railways of the country, in order to introduce the technical improvements in their financial situation of which I have spoken, must be able to furnish the basis of all long term credit—a safe surplus of revenue over expense, applicable to the payment of interest. This they cannot do unless they are enabled to earn satisfactory revenue from freight and passengers, thereby providing for meeting their obligations, and giving the holder of such obligations meantime, the confidence that his funds are in safe hands.

Something has been done in this direction by the recent 5 per cent rate decision of the Interstate Commerce Commission. This decision, however, is of more importance in what it suggests than in what it accomplishes. The basis for it is manifestly found in the statement that the railroads are recognized as having distinct and ascertainable needs, and to be authorized to collect sufficient revenue for the services they render to compensate the holders of their securities for the use of the funds intrusted to the carriers themselves. There has been an unmistakable turn in public opinion with regard to this subject. So long as the roads were regarded as possessing unlimited resources, practically indestructible by any kind of legislation or exactions, there was little hope of establishing a business basis for the acquisition of railroad capital.

It is only when the railroad is recognized as being a public utility both as regards the claim on the public and as regards its obligations, that a just balance between service and income can be developed. Such a balance it must now be the effort of the country to obtain. How can it accomplish the result? First of all, the dictates of the situation call for the development of a theory of railroad rates which will result in giving to the carriers a return upon all capital legitimately invested by them. Regulation cannot work in one direction only; it must operate to the advantage of the railways as much as to their disadvantage. It is traditionally a poor rule that will work only one way; and in this case, efficient service to the community dictates that the laborer shall be considered worthy of his hire. If railroads cannot tax the public according to their own will, as we all today, I think, agree that they should not, then the public cannot afford to tax the railroads to such an extent as to destroy the capital of those who have legitimately invested. Neither can the railroads be expected to go on extending their facilities and increasing their services to the public unless they are guaranteed at least that minimum rate of living wage which is demanded by laborers in the interest of society.

It may be an unpopular saying, but nevertheless a true one, that the wages of capital must be paid quite as regularly and quite as fully as those of labor, if capital is to continue to perform its functions in the community. Those who save and invest capital, will not continue to do so if their savings and investments are so affected as to yield them no return. The great mass of the public appreciates the problem and sympathizes with the difficulties of those enterprises in which they are themselves interested much more strongly than in those which are to them only an abstraction. This is true of the railways. There has undoubtedly been a large advance within recent years in the distribution of both stock and bonds of the carriers among the public at large. But rapid as this progress has been it has not yet been rapid enough to meet the requirements of the case. It has not gone far enough to solve the difficulties of the situation. It has not reached the real root of the difficulty.

Too much railroad capital has been derived from the banks and financial institutions, and has been carried by them as part of their investments. Too much railroad capital has been obtained through the sale of shares and bonds under conditions that have not resulted in attracting the real ultimate holder. It is necessary to get the shares and obligations of the railroads into the hands of the mass of the public, and to make the people really and in fact proprietors of the transportation lines. This measure is called for urgently from the financial standpoint for the reasons which I have thus set forth. It is, however, called for much more urgently from the social standpoint. The carriers are public utilities. And this character is not one-sided but must be considered from every aspect. The roads should be public in the sense that they appeal to and depend upon public support as well as in the sense that they must render public service and must meet the requirements of the community for accommodation. When in this sense the railroads have been popularized with the community, a two-fold benefit will result. The banks and investment institutions of the country will be relieved of the necessity of carrying long term investments when they should be devoting their funds entirely to the development of commerce and business, while on the other hand the people who are holders of the securities, will recognize the claims of those who look to the railroads for earnings, as well as to those who look to them for accommodation.

When this result shall have been attained, and in proportion as it shall have been attained, the so-called rate problem will have disappeared. The public will no longer look upon the railway as an incubus, and will begin to regard it as a business partner. It will no longer feel that every dollar paid into a railroad treasury is a dollar deducted from the community's wellbeing, but it will recognize the same mutuality of benefit in dealing with the carrier as is recognized in local communities where men deal with others because they expect those others to deal with them in return.

PUBLIC WORKS IN QUEBEC.—Sir Lomer Gouin, Premier of Quebec province, says that the provincial government continues to subsidize the construction of steel highway bridges. Some 260 bridges have already been put into service, and 56 are now under construction. This has entailed an expenditure, since 1908, of about $700,000. Since 1912 the government has abolished 11 toll bridges and 6 railroad-and-highway grade crossings, at a cost of about $1,400,000.

The Pennsylvania Improvements Through Piqua, Ohio

The Work Includes a New Station and Second Track on Revised Grade, Eliminating Eight Street Grade Crossings

The improvement work recently completed by the Pittsburgh, Cincinnati, Chicago & St. Louis on a six-mile section of line on the Indianapolis division, extending through Piqua, Ohio, 73 miles west of Columbus, is unusually comprehensive, as it effects important economies in the handling of a heavy through traffic, increases the permanency of construction on this section and adds greatly to the facilities for handling both freight and passenger business in a town of 13,000 inhabitants.

EXTENT OF THE IMPROVEMENTS

The operating conditions of the engine district from Columbus to Bradford, 84 miles, are improved by the addition of a second track in the only remaining single-track section in that district, and the reduction of grade from a maximum of 1 per cent uncompensated to 0.7 per cent compensated, the ruling grade on the division. The standard of construction is raised by the widening and thorough drainage of two long cuts, the replacement of an old low level bridge over the Great Miami river and the construction of steel concrete subways over all streets. In addition to the advantages enjoyed by the town as well as the railway in the separation of grades at streets, a new passenger station has been provided, the freight station has been enlarged, and the local freight yard and industry tracks improved. The railway has met the entire expense of the improvement, including damages to personal property.

This six-mile section forms a part of the main line of the Pan Handle from Pittsburgh to Chicago, and also of the line from Columbus to Indianapolis, which forms part of an alternate route from Pittsburgh to St. Louis. The westbound traffic consists largely of coal from the Pittsburgh division and the Norfolk & Western at Columbus and the eastbound business includes meat, merchandise and stock from Chicago and the west and empty coal cars. The average train movement is about 85 trains per day.

In addition to the Pennsylvania trains, the old single track line handled the passenger and local freight trains of the Cincinnati, Hamilton & Dayton between the connection of the Piqua & Troy Branch just west of the passenger station and the Cincinnati, Hamilton & Dayton junction, about a mile east of the station. Under the old arrangement these trains in order to reach the center of Piqua used the Piqua & Troy Branch and the Pennsylvania between Troy and Piqua Junction instead of the C. H. & D. main line on the east side of the Miami river. These movements increased the total for that portion of the Pennsylvania's line to about 97. This operating arrangement had to be terminated when the Pennsylvania tracks were elevated through Piqua on account of the inability of the C. H. & D. to secure ordinances from the city for the elevation of its branch line tracks up to the Pennsylvania connection. A new station was therefore built near the junction and all C. H. & D. through trains now use its main line.

The tonnage rating on the Columbus-Bradford district was limited to 1,700 tons in both directions by the old grade through Piqua and on account of delays in this single-track section it frequently required 16 hours for the run with a full tonnage train. As soon as the first track on the new grade was put in service it was possible to add 200 tons to this rating and cut the running time for westbound traffic and later, similar economies were effected for eastbound traffic when the second track was put on the new level.

All construction work has been handled without interference to traffic. To facilitate the work through town the center line was shifted to the north an average of about 32 ft. The improvements involved the handling of 460,000 cu. yd. of grading; the placing of 40,000 cu. yd. of concrete in bridge substructures, retaining walls, etc.; the erection of three arch culverts, a five-span deck plate girder structure over the Great Miami river and solid floor bridges over eight streets; and the laying, ballasting and surfacing of about 20 miles of new main, side and yard tracks.

GRADING

By laying a continuous 0.7 per cent compensated grade line from the ends of the improvement down to the river crossing, the cuts at both ends were deepened enough to furnish the necessary material for filling across the valley on the higher level. When the plans were made it was expected that the C. H. & D. would elevate its branch line, and on this basis the quantities of excavation and embankment were balanced, allowing 10 per cent for waste. On account of the change in plans, about 20,000 yd. from the west cut intended for the C. H. & D. connection was used to widen the fill for yard tracks.

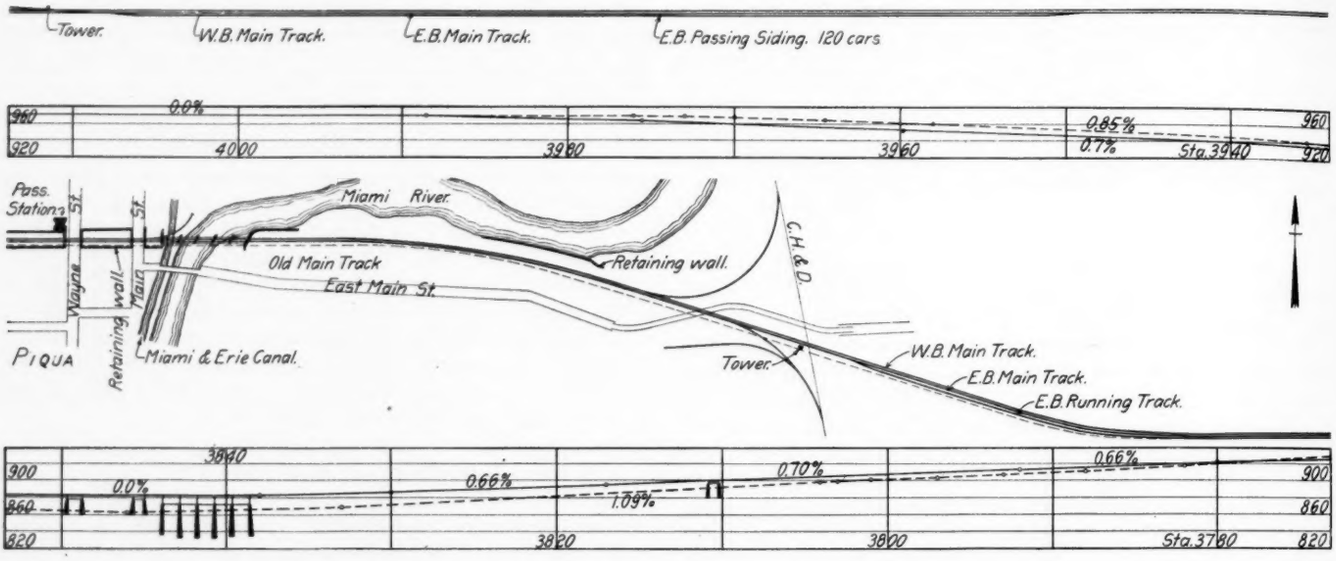
The cuts are about 7,000 and 9,000 ft. long, respectively, and were lowered a maximum of about 9 ft. They were widened to carry three tracks in order to allow the excavation to be handled without interference to traffic and to provide for a future additional track. The roadway section in these cuts provides for a distance of 17 ft. from the center line of the outside track to the toe of the slope. The banks were sodded during the first season's work, but this did not prove entirely satisfactory on account of the height of the slopes which exceeded 25 ft. in many cases. Where the banks showed any indications of being wet, trenches 2 ft. deep were dug vertically or diagonally down the slope and filled with riprap stone to provide an open drain to the side ditches. These bank drains have been very successful in keeping the slopes in good condition.

Tile drains 6 in. to 18 in. in diameter were laid in one side ditch in each cut and a similar line of 6 in. to 12 in. tile in the other ditch. Bell end vitrified pipe was used for these drains laid with 1-in. open joints and covered with cinders or loose stones. Catch basins were provided at intervals of about 800 ft. These drains lead to open riprapped ditches. The effect of one of the large drains was clearly shown in the east cut, which had a width of only 9 ft. from the center line of tracks to toe of slope. After one-half of the new cut was finished the side drain was laid, with the result that a temporary cinder ballasted track in that cut was easily kept in condition and the remaining half was noticeably drier when it was excavated. The slopes were finished and the ditches dug by an American ditcher.

The new double-track fill is about 2½ miles long, with a maximum height near the river of about 19 ft. The standard top width is 37 ft., providing a shoulder of 12 ft. from center of track. The material handled was mostly clay, requiring an allowance of 10 per cent for shrinkage on the shoulders. A speed limit of 10 miles per hour was enforced on the new fill and 20 miles an hour was allowed after it became thoroughly compacted. The main track is laid with 100-lb. rail on oak ties with four rail anchors per rail. The roadbed is surfaced with 6 to 8 in. of cinders on which 12 in. of gravel ballast is placed.

The excavation was made almost entirely by two Marion steam shovels, models 60 and 70, and the material was handled by a standard gage and a narrow gage outfit. The grading was planned to avoid the necessity of hauling the material across the old river bridge on account of the interference to traffic that would have resulted. Some trestle was driven west of the river between the street crossings, but the lighter fill on both sides and the big fill adjacent to the river on the east side were made by spreading and raising tracks. Some very good records were made in handling this filling material by keeping the dump in good condition and anticipating as far as possible, other causes

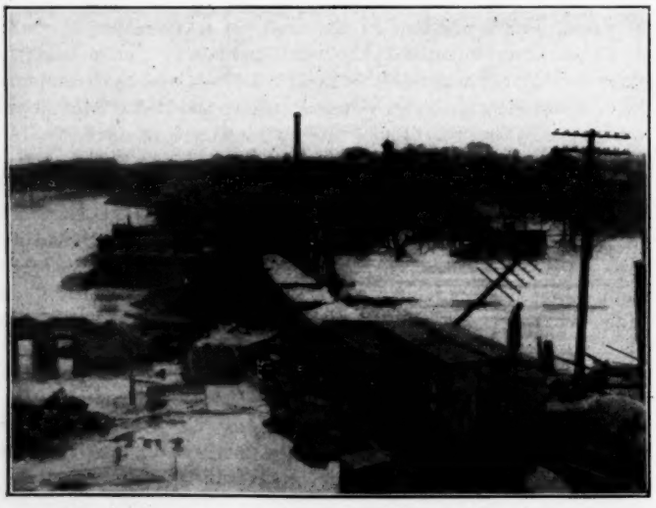
of delay. The standard gage outfit of two 10-car trains with an average haul of about 1½ miles handled an average of 1,200 yd. per day for eight months, working a single shift. The best month's record was about 41,000 cu. yd. The 15-yd. Western dump cars were used in this outfit, averaging 12 to 13 cu. yd. loaded. The narrow gage outfit, using 20-ton dinkies and 3-yd. cars, handled as high as 1,300 yd. per day, 17,000 yd. in two weeks, and 30,000 yd. in one month. Three trains of 15 cars each were used in this outfit, the haul being about two miles.



Plan and Profile of New Two-Track Line on Revised Grade Through Piqua, Ohio

BRIDGES AND RETAINING WALLS

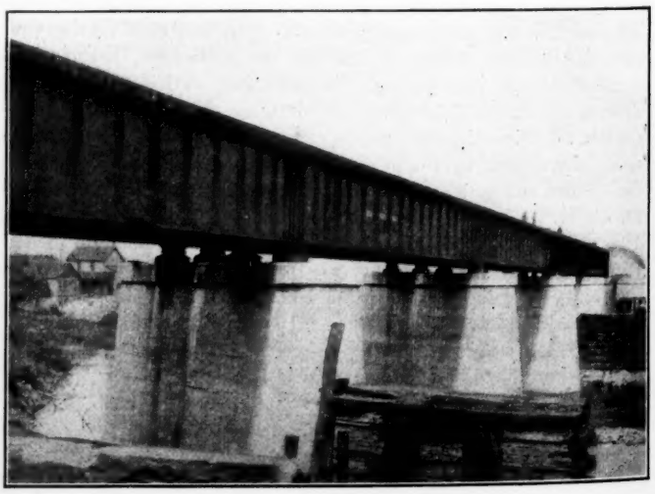
The new river bridge replaces a through truss structure on stone piers and abutments built in 1888. The two river spans, each 138 ft. long, and the approach deck girder span over the Miami and Erie canal, did not provide a sufficient waterway for the floods to which the river is subject and the new bridge was accordingly increased in length to five 105-ft. deck plate girder spans. The danger from floods is further decreased by the raised grade, the old tracks being only about 5 ft. above high water. Prior to the disastrous floods in the spring of 1913, the river channel was changed at the curve above the bridge and the bank protected by levees on the north side and a retaining wall 300 ft. long on the south side connecting to the east abutment of the new bridge. The piers are skewed about 30 deg. to bring them in line with the current.



High Water at the Old Miami River Bridge in the Spring Floods of 1913 Showing Piers in Place for the New Structure

The excavation for the piers was made by two McMyler cranes, one with a 1-yd. orange peel bucket and the other with a 1-yd. clam shell bucket. The footing piles under the east abutment and the three easterly piers were driven by one of the cranes with suspended leads in which a No. 2 Vulcan steam hammer was operated. The west pier and the west abutment are founded on limestone, which is only 2 ft. below low water at the pier site, although it dips so rapidly to the east that it was not reached by 15-ft. piles at the next pier. The piers were built in coffer-dams with steel forms above the footings. The maximum height is 47 ft. Three 85-lb. rails were provided in the nose of each pier as ice breakers.

The concrete in the east abutment and the three easterly piers was placed from a mixer plant about 60 ft. east of the abutment. The sand and stone were dumped through a trestle in the old line which had been driven to replace a section of the old fill adjacent to the new abutment and piers. From the storage bins under this trestle, the proper proportions of the materials were loaded into an automatic dumping car which was hauled up to the ½-yd. Ransome mixer. The concrete was handled to the forms in buckets by the locomotive crane. The west pier and the west abutment were placed from a portable plant which was also used

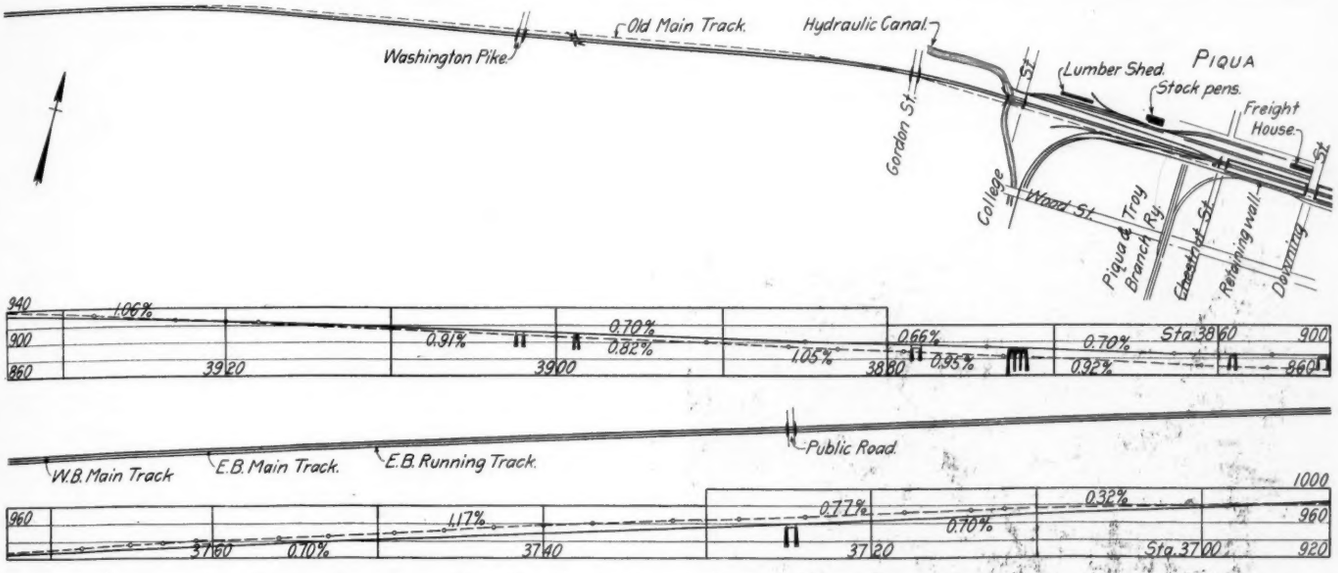


The New Miami River Bridge

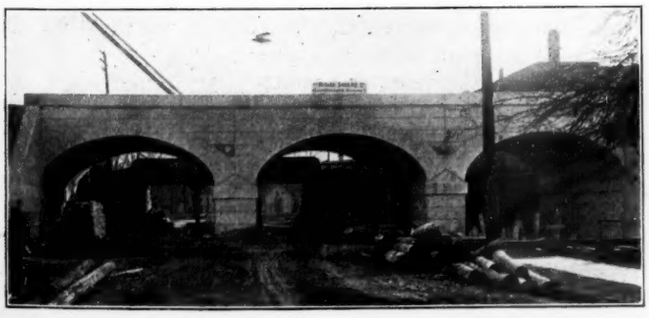
for a large part of the retaining walls and subway abutments through town.

The six existing streets and highways crossing the line within the limits of this improvement were carried under the elevated tracks in subways and similar provision was made near the west end of the work for two new streets which it is expected will be opened. With one exception, these structures consist of concrete abutments and steel columns on the curb lines supporting steel trough decks filled with concrete. The exception is a three-span arch bridge over a street and a canal from which the city takes its water supply. The possibility of adding third and fourth tracks later was considered in designing all subways, either by building the abutments wide enough to carry the additional tracks or by providing for an extension of the substructure. The overhead clearance under these subways is 13 ft. at four streets, 15 ft. at three streets, and 17 ft. at the other streets.

It was necessary in only one case to depress the street grade, and in this instance the tracks were carried on a temporary trestle, while the excavation for the street was made with a Thew shovel to an approach grade of 4 per cent. This required the handling of 16,000 yd. of material. A total of 4,700 ft. of retaining wall was built, the longest continuous wall being along the south bank of the river east of the bridge where a 300-ft. wall containing 6,000 yd. of concrete was placed.



Plan and Profile of New Two-Track Line on Revised Grade Through Piqua, Ohio



Three-Span Arch Bridge Over College Street and a Small Canal

The maximum street width is 66 ft., and with one exception the crossings are practically at right angles. The longest trough span is 44 ft. A line of 10-in. clay tile is laid in each trough and in some of the deeper ones, two lines are used in order to save concrete and reduce the dead load. A 3-in. layer of concrete was placed first, on which the tiles were laid, the concrete being tamped solidly around them. The top of the troughs were covered with concrete to a minimum depth of 2 in., and the upper surface of this concrete was waterproofed, four processes being used, namely; Sarco, Johns Manville, Barrett and Erhart. The edges of the trough decks were finished with concrete copings. The arch bridge has three spans of 37 ft. 6 in. each, the arch rings being five-centered. The concrete is reinforced with Clinton wire mesh. The fill over the haunches was made with cinders.

A large part of the walls and subway abutments through town were placed with a mixing plant operating on a 10-ft. gage-track between the walls as shown in one of the accompanying illustrations. This plant was equipped with a storage bin for sand and stone above the 1 yd. Ransome mixer and a 40-ft. tower in which the concrete was elevated for chuting to place. The boiler, hoisting engine and mixer engine, were located on the opposite end of the car from the tower, serving as a counterweight. The sand and stone were handled direct from gondola cars alongside to the storage bins over the mixer by a locomotive crane which was also used to place bags of cement on the charging platform, handle the sections of wall forms and excavate for the footings under the walls. The plant could be moved easily to keep the length of chute at a minimum. This plant placed as much as 150 yd. of concrete in a single shift and averaged 35 yd. of concrete and 25 yd. of excavation every working day for the entire season. The plant was operated by a crew of 8 to 10 men with a labor charge of about $35 per day.

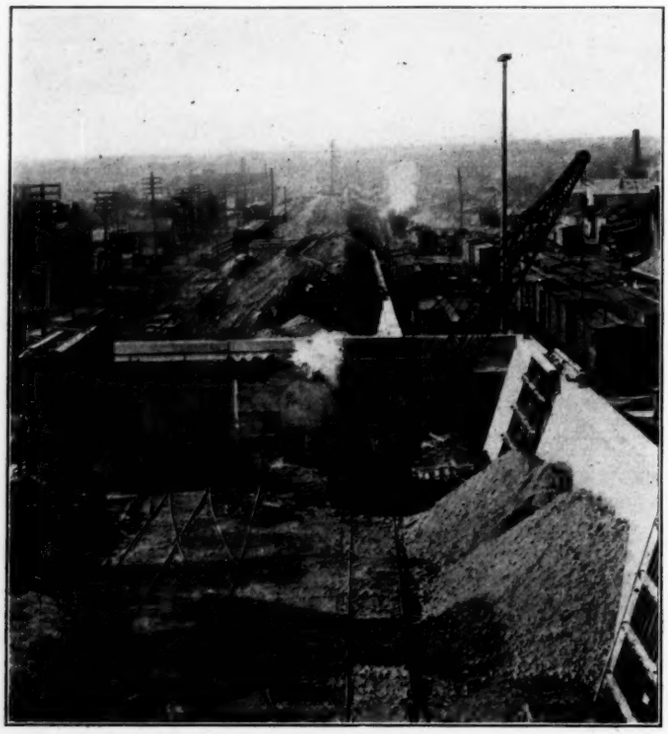
Portable Mixer Outfit Used in Placing Concrete Retaining Walls, and the Derrick Car Used to Handle Material from Cars to Hopper Bins

A stationary mixer plant was used during the winter for some of the walls. The storage bins were provided with steam coils

and the plant was well housed in to allow work to be carried on in cold weather. About 2,200 yd. of concrete was placed during one month with this plant.

PASSENGER STATION

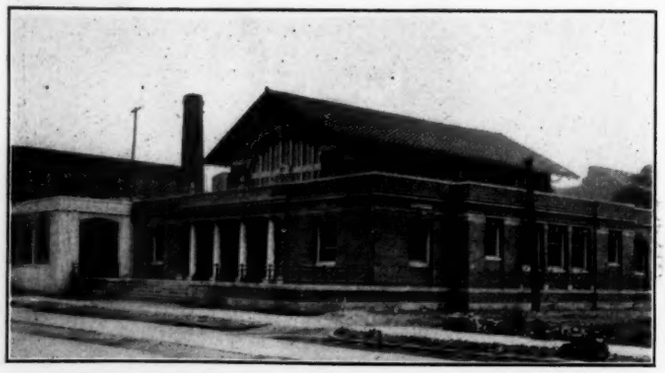
The new passenger station is a brick structure on concrete foundations with stone trim and tile roof. It is located on an important street near the center of town with its floor level about 3 ft. above the sidewalk grade. A wide terrace across the



A View Through the Town During the Construction of the Retaining Walls, Showing Sectional Forms and Derrick Car for Handling Material

front of the building connects with a passage under the track from which two stairways lead up to the platforms at track level. Additional stairways are provided at the streets on both sides of the one on which the station is located and a carriage drive approaches the rear of the station building from the opposite street.

In addition to the main waiting room the building contains



New Pennsylvania Passenger Station at Piqua, Ohio

a women's room, men's room, ticket office, baggage room and express room. A basement is provided for the furnace and coal room, and a baggage and express elevator connects the station and track levels. The floor in the waiting room is of terrazzo, the walls of brick and the arch ceiling of plaster. The building is provided with electric light and steam heat throughout. The track platforms are 20 ft. wide, of brick on a concrete base with concrete curb. Steel frame shelter sheds and a small shelter house are provided on each platform.

This improvement has been carried out under the general direction of W. C. Cushing, chief engineer, maintenance of way, and B. V. Sommerville, principal assistant engineer, Pennsylvania Lines West, Southwest System. F. H. Watts was division engineer at the beginning of the work and was later succeeded by G. R. Barry. Mr. Watts was charged with the preparation of plans and the close supervision of the construction till promoted and succeeded by Mr. Barry. E. H. May was engineer in charge. H. E. Culbertson & Co., Cleveland, Ohio, had the general contract and handled the grading. The construction of the river bridge and most of the retaining walls and subway abutments was let to the McKelvy-Hine Company, Pittsburgh, Pa.; the concrete arch and the remaining concrete work was contracted to the Hezlep Sinclair Company, Cleveland, Ohio; the steel in the river bridge and the subways was erected by the Ketler-Elliott Company, Chicago, and the sloping, ditching and track work was handled by company forces. F. L. Packard, architect, Columbus, Ohio, designed the new station, and George B. Hicks, Springfield, Ohio, had the contract for the construction of the building.

SAFETY AND SHORT TRAINS*

By Marcus A. Dow
General Safety Agent, New York Central Lines.

This bill to limit the length of trains to a maximum of 50 cars per train, has been presented and its passage urged as a measure of safety, it being the contention of the gentlemen favoring the measure that shortening the length of trains will lessen the chances of accident and reduce the number of injuries. To persons unfamiliar with the details of personal injury work and the prevention of accidents as undertaken by the railroads of today, this argument may appear reasonable, but before accepting it as a conclusion it is essential to consider a number of important facts.

In the first place, the fact must be admitted, even by those the least informed, that safety in reality rests not upon whether there are a few cars more or less in a given train, but upon the way in which that train and others on the same road are handled and operated. There is not now, nor has there ever been a well fortified argument for, nor a sincere demand to shorten the length of trains to increase safety. The Interstate Commerce Commission in all of its exhaustive studies and reports has never pointed out a single case where the number of cars in a train, nor the number of men on a train, nor the number of engines hauling a train was a factor contributing to or causing an accident.

As a matter of fact, if the proposition were fairly considered, it would seem reasonable, if not probable, that the passage of the so-called "short-train" bill will tend to increase the risk of injury rather than decrease it. The density of traffic as measured by the number of trains to handle and get safely over the road, will increase with the shortening of the train, resulting in a greater chance of confusion and increasing the chance of error. This feature, of course, becomes more important on roads where the traffic is heaviest and density of traffic is already a problem requiring the most skillful attention of expert operating men. To suddenly require all roads to multiply the number of trains they must handle without a corresponding increase in trackage and other facilities would necessarily result in confusion and increased hazard.

Much stress has been laid by the supporters of this bill upon the great sacrifice of life and limb on the railroads of this country. Admitting freely that there are far too many persons

*From an argument made by Mr. Dow before the Public Utilities Committee of the Illinois house on Monday, May 10. This committee has since taken unfavorable action on the bill.

injured on our railroads and that many of the accidents resulting in injury can and should be avoided, I wish to point out how these accidents can be prevented and what steps are being taken to prevent them. For years there has been a nation-wide agitation in behalf of greater safeguards for employees of railroads, other industries and the general public. In every state there has been a veritable epidemic of legislation with a view of protecting the workingman from possible injury. Safety devices of every description have been installed, rules formulated, regulations adopted and mechanical safeguards invented and applied until it would seem that accidents never could happen. But, the disquieting feature of the situation has been that up to a year ago in spite of these extraordinary precautions taken to insure immunity from harm, accidents resulting in injuries increased steadily, and the very laws that were made to lessen accidents actually seemed to foster them. It remained for the officials of the railroads and other great industries to discover where the real trouble lay. The conclusion was reached that with all the laws that might be passed and safety devices that might be installed, there would be no successful reduction in accidents until there had been enlisted the co-operation of those in whose interest these precautions were being taken.

In other words, it was found that the human element was knocking all the carefully laid plans of well meaning legislators into a cocked hat, and with this fact in mind there has been launched within the past few years what has universally been called a "Safety First" campaign, and practically every railroad in the United States is now vigorously conducting such a campaign, regardless of the expense incurred thereby. On the New York Central Lines during the year 1912 only 9.65 per cent of all injury cases were due to defective equipment, tools or appliances, the balance being due to fault of injured man or another employee, or else unavoidable. This statement speaks for itself, and supports the contention that the making of laws and installing safeguards is not the solution of the accident prevention problem. Rather does it depend on the extent to which the employees co-operate in an effort to eliminate practices and conditions which are unsafe and which lie within their own power to correct.

I wish to refer to some of the advertising matter that has been sent out by supporters of this "short-train" bill, and call your attention to some things contained therein which will undoubtedly mislead you if you are not acquainted with all the facts. A post card which was mailed broadcast to citizens of this state, as well as to members of this legislature, decries the fact that 593,359 people were killed and injured on the railroads of this country in the three years from June 30, 1911, to June 30, 1914, and particular stress is placed on the fact that 31,851 of those injuries resulted fatally. They do not attempt to further enlighten you by telling you, truthfully, that 16,463 of these persons killed, or more than 51 per cent were trespassers who voluntarily and needlessly risked their lives by going upon the railroad tracks where they had no right to be. Neither do they attempt to explain that 12 per cent of those killed were travelers-on-the-highway killed on grade crossings, or other outside persons, and that only 30 per cent of all those killed were employees of the railroad on duty, while only 3 per cent of the killed were passengers. They point accusingly to the fact that in three years there were 593,359 persons killed and injured on railroads in the country, leading you to believe that railroad work is the most hazardous of all occupations—and that a railroad is a veritable industrial slaughter house, whereas in truth railroad casualties form only a small part of the total industrial accidents annually, conservative statistics of large insurance and casualty companies indicating that more than 30,000 persons in all industrial occupations are killed and more than 2,000,000 injured every year.

These figures do not include other than industrial accidents, such as those occurring in the city streets, etc. The coroner's record for the city of New York indicates that during the year 1913, a total of 5,750 persons met violent death in the borough of Manhattan alone, of which 402 were in street accidents, 867 were due to falling out of windows, down stairways, off from scaffolds, etc., and 215 due to accidental drowning.

Interstate Commerce Commission figures indicate that during the year ended June 30, 1913, on all the railroads of the country there were 181 passengers killed in train accidents, while during that period there were 1,018,283,000 passengers carried, so that there was one passenger killed in a train accident for every 5,625,873 carried, regardless of the distance they were carried. In the city of Chicago alone during 1913 there were 372 persons killed in the city streets by being struck or run over by some moving street vehicle. Chicago has a population of approximately 2,500,000. Therefore, as against 372 inhabitants of Chicago killed in her streets by moving vehicles, and hundreds more of her citizens killed in various other ways in a single year, the railroads of the country transported more than twice as many passengers as Chicago has inhabitants before one was killed in a train accident.

The proponents of this bill have insistently intimated that the railroads almost without exception have accidents every year resulting in fatal injuries to passengers, the statement having been made that it is questionable if any railroad except the New York Central went through last year without killing a passenger. During the year 1913 there were in the United States steam railroads of 299 operating companies, with a mileage of 120,901 miles on which there was not a passenger killed in a train accident, although there were more than four hundred million passengers carried by these roads.

Interstate Commerce Commission figures also indicate that in the year ended June 30, 1913, there were 557 employees killed in train accidents. During that same period the railroads transported 300,558,334,000 tons of freight one mile, with an average of 14.31 tons of freight per car or 210,033,776 loaded cars one mile, so that one employee was killed in a train accident for every 37,708,039 loaded cars moved one mile. And what does this indicate—simply this, that for every hundred loaded cars operated a distance of 377,080 miles one employee was killed, and this, mind you, does not take into consideration the vast number of empty cars handled at the same time. In other words, one railroad employee was killed in a train accident for each hundred loaded cars transported a distance equal to 15 times around the world, or as far as from the earth to the moon and half way back.

Another fact in connection with these figures indicating 593,359 persons injured and killed on the railroads in three years which must not be overlooked, is that the majority of these injuries were of a more or less trivial character. We know that a little over 31,000 of the cases, resulted fatally, of which 51 per cent were trespassers. Of the injuries every case is included where the employee lost more than three days from work, and injuries were reported as such which often consisted of only a bruise or scratch of the hand, or some other minor injury. An examination of the New York Central records of injuries for a year indicates that only one out of every 227 employees injured was permanently disabled.

Less than 10 per cent of all railroad injury cases are due to collisions and derailments, and even the majority of these are in accidents which could only be prevented by greater care on the part of human beings involved in the accidents. The Interstate Commerce Commission employs expert investigators, who make investigations into the causes of wrecks on railroads throughout the country. These investigations are exhaustive and often weeks, and even months are consumed enquiring into every detail of a single train accident. During the 12 years, 1902-1914, the commission investigated directly, through its own agents, 1,570 train accidents, of which only 218, or 14 per cent were caused by defective track, equipment or appliances, and 15 per cent were due to bad weather, outside agencies, unknown causes or unavoidable, while 1,120 or 71 per cent of the train accidents investigated by the commission in the 12 years were found to have been due to the fault of a member of the train crew, a

despatcher, operator or some other employee. The human element! It can never be effaced by all the safety appliances that can ever be invented and applied, nor by all the laws and regulations that can ever be passed and enforced.

On the New York Central the average number of cars per train increased 3.11 cars in 1914 over 1913, notwithstanding which fact there was a decrease in every class of accident. There was a decrease of 73 per cent in trainmen killed and 39 per cent in trainmen injured; of trainmen in yards a decrease of 33 per cent killed and 42 per cent injured; of yard trainmen killed a decrease of 19 per cent and injured 39 per cent. While a part of this decrease was brought about by safety educational work, it is partly attributable to the fact that with an increase in the average number of cars per train, there was a decrease of 18 per cent in the number of trains run. In 1914 there was on all the railroads a decrease in all classes of injuries in train accidents, and it is known that the length of trains did not decrease in that period, but rather did it increase, while the number of trains operated on the roads in general decreased thereby decreasing the hazard.

The contention is made that with a shorter train there would be a better opportunity for the crew to make inspection of the running gear, brake rigging, etc., while stopping at points en route. In the first place, it should be clearly understood that on virtually every railroad today trains are made up in terminals by a yard crew, are inspected before leaving by car inspectors located at the terminal, and then turned over to a road crew, which latter crew has nothing to do with the train until it is made up, inspected and ready to leave the terminal. As far as the more lengthy trains are concerned, the only stops made are as a rule to take water or at meeting points. Little or no switching is done en route so that cars are not handled roughly. The longer trains must necessarily travel at slower speed than the shorter ones, so that possibility of accident to the long train is decreased thereby. As far as making inspections en route, as every crew is required to do when stops are made, this rule is expected to be lived up to and crews must take the time to do the inspecting work required of them and the length of the train, no matter whether long or short, has never been nor can it be given as an excuse for non-compliance with this rule. As to any contention that accidents would result from drawheads pulling out on longer trains, while it is true that drawheads do pull out occasionally, it is an occurrence not confined to long trains and the truth of the matter is when they do pull out it is usually when the train is starting, and at a time when no accident would occur.

To suddenly increase the employees to the number that would be necessary to man the many additional trains the passage of this law would require, would mean another element of increased hazard instead of a decrease in hazards, because every green man that is employed is an experiment at the best.

PIECE WORK IN THE FREIGHT OFFICE

In the freight office of the Chicago, Rock Island & Pacific at Burr Oak (Chicago) the clerks who make waybills and those who examine claims have for the last twelve months been making waybills on typewriters. They have been paid at the rate of ninety cents a hundred items for making waybills and seven cents each for attending to claims for overcharges and damage; and the agent, J. W. Lawhead, in the Rock Island Employees' Magazine for May, gives the results of the year's experience.

Previous to May 1, 1914, waybills were made with pen and ink, each clerk receiving $75 a month and usually about $10 additional for overtime. Three claim investigators received $70 a month, these men helping the bill clerks in the afternoon and being helped by them in the morning. The billers usually got through their work about 9 p. m. Eight Remington machines were put in service in April, but before beginning the year (May 1) it was found that seven would be enough; and on May 16 the billing force was reduced to six men. The office handles 2,000 claims a month and bills out 50,000 items. This work now costs an average of $590 a month, which is $200 less than the former cost, two claim investigators having been taken off at the beginning of the new arrangement. A revising clerk goes over all of the waybills for errors before they are sent out; another man—clerk to the bill department—sorts the tally sheets when they come from the loaders, and still another is the extension clerk, who using a comptometer, puts on each tally, before it goes to the bill clerk, the amount of freight charges for that item. The office force was changed around so that these new positions involved no new expense.

The bill clerks come on duty at 9 a. m., about an hour later than formerly, and usually finish about 6:30 p. m. In the twelfth month, April, 1915, out of 29,638 items billed, the six clerks had made 165 errors, all of which, except six, were caught by the revising clerk. This averages one error to each 175 items. If a clerk's errors amount to more than one in 200 he is subjected to a slight penalty, and has his name posted on a bulletin. Making less than one in 200 in a month he is given a clear record for that month. In March two men made clear records, one having billed 12,580 shipments and the other 12,741, with errors numbering 42 and 62 respectively. The woman with the comptometer makes an average of 2,199 calculations daily, figuring all pre-payments twice. During March she was caught in only eight errors. Mr. Lawhead recommends the comptometer also for other work in the freight office. He has two of them in use.

INCREASING THE AVERAGE DAILY CAR MILEAGE ON THE GREAT WESTERN

During the past year the Chicago Great Western has been giving careful attention to the elimination of delays to cars, with the result that the average mileage per car per day has been materially increased. The following comparison by months with the similar performance one year ago shows the average increase to be from 24 to 27.7 miles, or 15 per cent.

Month	Average per car per day 1913-14	1914-15
April	26.3	28.7
May	26.2	29.1
June	24.8	27.5
July	21.8	26.0
August	21.9	27.6
September	23.0	27.8
October	23.0	28.8
November	23.8	28.0
December	24.7	27.6
January	24.1	27.5
February	24.7	25.7
Average	24.0	27.7

This improvement has resulted largely from three causes. While the road has not been extravagant in the use of power and has taken engines out of service as the traffic has decreased, it has maintained in service a sufficient number of locomotives at all times to handle the traffic promptly and to prevent any delays because of lack of motive power.

A second reason contributing to this result is the 12-hour telegraphic daily reports sent to the general manager by each superintendent at 9:00 a. m. and 4:00 p. m. These reports show the conditions at each terminal in the morning and evening, giving the number of cars on hand awaiting movement in each direction with causes for any delays.

A third measure is the close supervision of cars at all stations by the superintendent of car service who keeps informed regarding conditions at each station on the line and the reasons for any delays in cars at those points. The results of this continuous supervision and attention to this phase of operation by the general manager, the superintendent of car service and other operating officers, show the possibilities in this field.

Tests of Exhaust Ventilators on Passenger Trains

Results of Experimental Work Carried Out During Past Winter; Effects of Position of the Car in the Train

By George L. Fowler
Consulting Mechanical Engineer, New York

During the past winter an investigation was conducted to determine the operative efficiency of the Standard exhaust ventilators used on the passenger equipment cars of the New York Central. Prior to this the only data available as to their operation was that obtained in laboratory experiments conducted by the makers, the Standard Heat & Ventilation Company of New York, to determine the ratio existing between the velocity of the wind blowing over the ventilator and the volume of air that would be exhausted by the action of the ventilator. This data will be referred to later.

The Standard exhaust ventilator is pressed from sheet steel and its general outside appearance is that of a quadrilateral pyramid with one side removed. Its base, which is open, is bolted to a side opening in the deck of the car. Its bottom is the side removed and the shape is such that when air is moving past it, either parallel to the center line of the car or at an angle thereto, an induced current is produced, flowing out at the open side. As this opening communicates directly with the interior of the car, through the base, this induced current is supplied by the air within the car and the exhaustion of this air follows, coupled with the ventilation of the car itself.

The purposes of the investigation were to ascertain the quantity of air removed from the car per hour, under the ordinary conditions of service; the rate of the exhaust removal of air at various speeds, so as to obtain the percentage of efficiency as compared with the results of laboratory investigation, which latter may be regarded as the theoretical or highest efficiency; the effect of wind direction; the effect of the location of the ventilator on the car, or the car in the train; the movement of the air currents within the car; the variation in barometric pressure within and without the car, and the amount of air delivered at the breathing zone.

The car selected for the purpose was a standard steel passenger coach of the New York Central lines. It was 69 ft. 4 in. long inside and had a seating capacity for 84 passengers and a cubic content of about 5,160 cu. ft. The car was fitted with twenty Standard exhaust ventilators, ten on each side, alternating with plain perforated metal deck opening screens of which there were eleven on each side. Both deck and exhaust openings could be closed by a Cheeny deck sash. The deck openings measured 28½ in. by 8¾ in. The exhaust openings were trapezoidal in form and had a free opening of 54½ sq. in., or .378 sq. ft., which was reduced by the dial of the anemometer placed in front of them to .359 sq. ft. No screen or netting was used with them.

INSTRUMENTS

For the purposes of the investigation the car was equipped with a vane anemometer, registering to 100,000 ft. of air flow, placed in front of each of four of the exhaust openings on each side. There was one at each end exhaust, with the other two spaced equally between, which made one for each third ventilator.

A cup anemometer of the regulation government type, was placed on the center of the roof of the car deck on the outside. It was arranged to make and break an electrical circuit for each one-tenth of a mile of the flow of the wind. This electrical circuit was arranged to operate a telegraph sounder by which a signal was given for each one-tenth of a mile of flow of air over the roof of the car.

A Boyer speed recorder was attached to one of the axles of the car, and the wire to the indicator was led up into the car. This made it possible to observe the speed at any instant and also retain a graphical record of the speed of the whole run.

A wind vane of standard government dimensions was placed on the center of the deck roof, in line with the cup anemometer, but at the other end of the car. The stem from this vane extended down into the car and had attached to it a pointer rotating over a dial, thus indicating at all times the angle at which the wind was blowing against the car, as a resultant of its own normal motion and that of the car.

A clock was arranged to make and break an electrical circuit at two-minute intervals. This was connected with a bell which sounded a signal for the taking of readings.

The apparatus used for the determination of the variation in barometric pressure, inside and outside the car, consisted of a wooden box, measuring 7 in. by 7 in. by 8¼ in. In each of five of the six sides of this box, eight holes were bored. These were each 5/16 in. in diameter and were widely scattered over the sides. In the sixth side a hole was bored large enough to admit the insertion of a rubber tube having a bore ⅜ in. in diameter. One end of the tube thus communicated freely with the interior of the box, while the other end was attached to one leg of a U-tube, which was half filled with colored water. The box was bolted to a board which replaced one of the deck opening screens. The small holes opened to the outside air and the rubber tube led down to the U-tube within the car, one leg of which was open to the air inside the car. It was thought that the air entering the box through the small holes, and under the influence of the pressure, would have its velocity greatly reduced by the relative sectional area of the box to that of the holes; that it would be so essentially calm as to produce no effect either for exhaust or pressure at the end of the tube, and that the barometric pressure within would be that of the external air, uninfluenced by the motion of the car. The areas were to each other as about 80 to 1, so that air entering the box at the highest recorded wind velocity, even though unchecked by passing through a rough hole 5/16 in. in diameter and 1 in. long would move through at a rate of less than one mile an hour.

MOVEMENT

The car, so equipped, was handled on regular passenger trains for one round trip between Albany and Buffalo; two round trips between Albany and Syracuse, and one round trip between Albany and Weehawken, a total distance of 1,466 miles. With one exception the trains were express. Between Albany and Buffalo six intermediate stops were made westbound, and sixteen eastbound. Between Albany and Syracuse there were fifteen westbound and twelve eastbound. Between Albany and Weehawken, there were thirty-four southbound and ten northbound.

OBSERVATIONS

Readings at two-minute intervals were made of the speed of the train, the velocity of the wind relative to the car and the direction of the wind relative to the car. At fifteen-minute intervals readings were taken of the anemometers in the exhaust openings, and at intervals between these readings observations were made of the rate at which air moved through the exhaust openings. The readings for these observations were taken at 15 and 30 seconds intervals, the time and speed of the train being also noted. From the time at which the observations were made it was possible, by means of the two-

minute readings, to determine the velocity of the wind relative to the car.

AMOUNT OF AIR REMOVED PER HOUR

The amount of air removed from the car per hour was determined by the regular readings of the anemometers placed in the exhaust openings. The individual readings were widely scattered, but, when grouped and gathered under averages of speeds increasing by increments of five miles an hour, they were found to increase with the speed, and show, as would be expected, that the amount of air removed varied with the speed. The amount of air removed from the car under observation, in the eight runs involved, averaged 296,699 cu. ft. for each of the eight ventilators to which anemometers were attached. If this total is divided by the number of hours that the car was under observation, which was 41, we have an average removal of 7,236 cu. ft. of air per ventilator per hour. This covers all speeds and conditions of operation from standing still to 76 miles an hour. The average speed of all the trains between terminals was 35.7 miles per hour, elapsed time.

The rate of the removal of the air through the exhaust ventilators was obtained by taking readings of an anemometer, placed at one of the openings of an exhaust ventilator, at such short intervals of time, and in connection with the actual speed of the train at the instant, that it was possible to determine the actual rate at which the air was removed at different speeds of train and wind. During the whole period of these investigations, there was little or no wind stirring. The result was that wind velocity relative to the car corresponded very closely to that of the car itself.

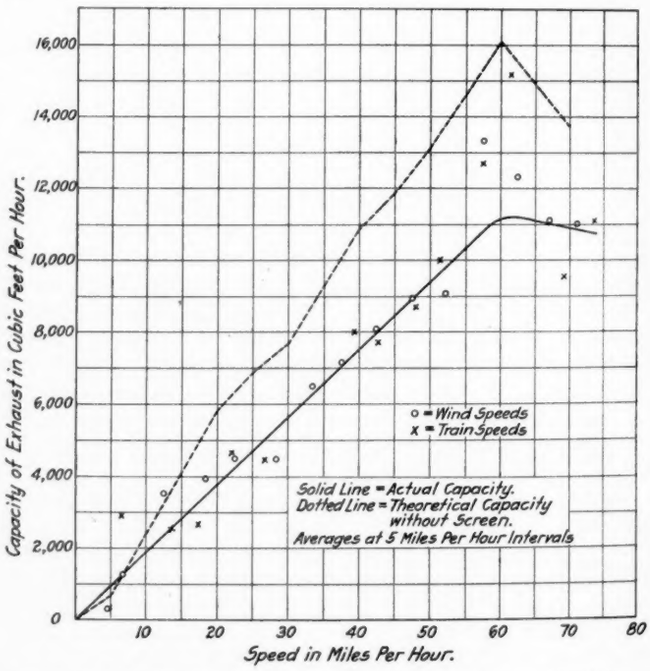
The readings referred to were taken at intervals of 15 or 30 seconds, and at speeds that ranged from zero to 75½ miles an hour for the speed of the train, and from zero to 72 miles an hour for the speed of the wind relative to the car. There were 201 of these observations, and they have been grouped together in five-mile intervals of speed and plotted in the accompanying diagram, under the average speeds. The anemometer readings, thus obtained have been taken to indicate the rate of flow of air through the ventilator at the several observed speeds, and this has been considered to have been uniform throughout the whole area of the exhaust opening. This is warranted by the results of laboratory investigations, in which it was found that, when the direction of the wind currents was parallel or nearly parallel to the center line of the car, the rate of exhaust flow was uniform over the whole area of the ventilator opening. This diagram shows a general progressive increase in ventilator capacity on a straight line up to 60 miles an hour of train and wind speed. In this case, the train and wind speeds being so nearly the same, it is impossible to differentiate between them in the construction of the median line.

For the purposes of comparison the diagram of the ventilator capacities obtained in the laboratory is plotted with those obtained in service. In the case of the laboratory investigation the capacities given are those obtained with the air moving parallel to the center line of the car, and it is interesting to note that there was a steady increase of capacity directly as the speed up to 60 miles an hour, followed by an immediate falling off as that speed was exceeded.

Owing to the absence of wind during the tests the direction of the resultant wind relative to the car indicated only a slight deflection. The average for all of the runs was but 9.35 deg., and it was near this point that the vane stood for most of the time. For this reason it is fair to compare the ventilator capacities obtained in practice with those of the laboratory, as is done on the diagram. If a comparison is made of the relative capacity of the ventilator under the two conditions, it will be found that up to a speed of 60 miles an hour the efficiency in service was about 70.5 per cent of the theoretical capacity of the ventilator, as measured by the laboratory experiments.

For the purpose of making a practical application of these results, let us take the figures already set forth as an example of what was done on the eight runs under consideration. In these we have an average performance per ventilator of removing 7,236 cu. ft. of air, and that at an average speed of 35.7 miles an hour, and under widely varying conditions from standing still to a speed of 76 miles an hour. According to the diagram each ventilator should remove about 6,700 cu. ft. of air per hour. The actual performances through a wide range of conditions check very closely, therefore, with those obtained from a detailed study of an individual ventilator. As the line of the diagram is straight from 0 to 60 miles an hour, the capacity of the ventilator varies directly with the speed, and may be obtained by multiplying the latter by 188.

Again, if we take the average speed of the train during elapsed time from the start to the last reading of the anemometers, and credit each anemometer for the removal of an amount of air corresponding to the elapsed time and the average speed of the train in accordance with the diagrams presented, it wi be found that, according to that diagram, each ventilator should have removed 282,797 cu. ft. of air. Comparing the two, we find the average actually removed was 4.9 per cent more than that calculated with the diagram as a base. Hence the diagram



Capacity of Standard Exhaust Ventilator as Determined by Laboratory and Service Tests

may be assumed to represent the conservative capacity of the ventilator, as this small percentage of variation is well with that allowable.

EFFECT OF LOCATION

During the course of the investigations the car was placed in different positions, from being next to the engine to seventh in the train. It will be readily understood that the data available from so small a number of runs is too meager to make definite conclusions possible; but what there is indicates that the location of the car in the train does have an effect on the operation of the exhaust ventilators. In order to determine this it was necessary to consider both the amount of air exhausted and the speed of the train. In this I have taken the total amount of air exhausted and prorated it among the eight ventilators that were fitted with anemometers. This gives the average rate of operation for the car.

According to the diagram the amount of air exhausted varies directly with the speed, so that by dividing the average amount of air exhausted by the average speed of the train a quotient

will be obtained that may be called the base unit of the operation of one ventilator for the particular run under consideration. If we take the averages of all readings and plot them in accordance with the location of the car in the train we find that there is a slow falling away in total capacity as the car is moved back from the engine; until for the seventh car, it is about 14 per cent less than for the first.

The effect of ventilator location on the car is also noticeable. By taking the ventilators, fitted with anemometers in pairs, as they were opposite each other, and averaging each pair for the several trips, it appears that, going back from the front, there is a steady fall in efficiency from the first to the third, with a rise for the fourth.

This indicates that the ventilators at the forward end of the car are most efficient, and that there is a falling off in efficiency at the middle of the car and a rise again towards the rear.

MOVEMENT OF AIR CURRENTS WITHIN THE CAR

Careful observations were made of the movement of the air currents within the car. This was done by means of smoke produced at the points at which it was desired to make observations. The doors and windows of the car fitted closely in their frames. At the cracks of the doors there was never sufficient air movement to operate an anemometer, though a coolness could always be detected. Also in the body of the car below the seven-foot line above the floor, no air currents of sufficient intensity to operate an anemometer could be detected at any time. The anemometer explorations were, therefore, all made in the deck space.

When the car was running at 60 miles an hour, an anemometer placed at the back end of the deck opening, which was 5 ft. 6 in. from the end of the car, showed air velocities of from 180 to 575 ft. per minute when the opening was at the front end. One-quarter of the way across the deck and opposite the opening they were still higher, and when the anemometer was placed close to the ceiling, they ran from 735 to 976 ft. per minute. Out at the middle of the deck, still close to the roof, they fell to from 250 to 440 ft. per minute. As the exhaust was approached on the opposite side of the car, three-quarters of the way across, the velocities increased again to from 600 to 680 ft. per minute. Dropping down into the car they ranged from 700 to 835 ft. per minute, even as low as the deck sill, but no movement of the anemometer could be obtained below the line of the parcel rack. This will give an idea of the velocities at which the air entered the car.

Studies of smoke movement showed that, when produced in the deck, it did not come down into the body of the car, but swept along towards the nearest exhaust ventilator and was carried out. When produced below the line of the deck sill it was quickly dissipated, but slowly came down into the car and then took an upward movement towards the ventilators. When produced in the body of the car in the breathing zone, it started at once for the deck, was nearly dissipated when it reached the sash of the ventilators and was then carried out with great rapidity.

On the run from Albany to Weehawken and return, observations were made as to tunnel conditions and effect. It is the practice of the road to close all of the deck openings and, at times, all of the exhaust ventilators, when passing through tunnels, of which there are three of some length. These are known as the West Point, Haverstraw and Weehawken tunnels. There is a fourth and shorter one at Rondout creek, but the locomotive is out of this before the rear of the train has entered.

In the runs under consideration all deck openings and all of the exhaust ventilators to which anemometers were applied, were left open. Immediately upon entering the tunnels, large volumes of dense black smoke rolled in at the front deck openings. The smoke swept back along the roof of the deck and out at the exhausts. None of it came down into the body of the car and none of it was perceptible to the senses, even to those immediately beneath, when it was so dense overhead as to obscure the head lining. This was true not only of the experimental car, but also in the regular working coach occupied by passengers, whose ventilation was regulated to accord with that used in the experimental car itself.

The runs from Albany to Weehawken, on the West Shore, were made with the twofold object of obtaining data as to the action of the ventilators in tunnels and when running alongside a high bank with a free and clear space on the other side of the car. These conditions obtained on the West Shore, where, for long distances, the track is laid along the bank of the river with high, steep banks on the west and the open river on the east.

It was suggested that, under these conditions, it might be possible that eddy currents, created by the normal wind and the movement of the car close to the bank, might be of such a character as to cause the exhausts to act as intakes. Nothing of the kind could be detected. The ventilators invariably performed their true functions as exhausters of the air within the car, whether running in the open, through tunnels or close to a side bank.

BAROMETRIC PRESSURE INSIDE AND OUTSIDE THE CAR

Under all ordinary working conditions, there was no perceptible difference in the height of the water in the two legs of the U-tube. But, with all deck openings closed, and the 20 exhaust ventilators, with which the car was equipped, open, there was a rise of level on the car side of the U-tube of 1/16 in. when the car was running at a speed of 53 miles an hour, and the wind velocity over the roof was about 54¼ miles an hour, thus showing that, under these conditions, the ventilators were capable of producing a partial vacuum in the car.

AMOUNT OF AIR DELIVERED TO THE BREATHING ZONE

Attention has already been directed to the fact that the circulation of air through the car, under all conditions of service, was of too quiet and gentle a character to be measured or detected by the delicate anemometers used. That there was a circulation, constant and persistent, is shown by the observations of smoke movements. The means adopted to determine the efficacy and efficiency of this movement was that of taking samples of air from the breathing zone of working cars occupied by passengers. These samples were afterwards analyzed for their content of carbon dioxide.

The method is generally known as that of Pettenkofer and "consists in estimating the vitiation of the atmosphere by determinating the amount of carbon dioxide that it contains, and from this computing the amount of air supplied for ventilation."

For the purposes of calculation it was assumed that each passenger would excrete .6 cu. ft. of carbon dioxide per hour, and that the incoming fresh air was diluted with 4 parts in 10,000 of carbon dioxide. The calculation is, then, simply that of estimating the amount of such air that would have to be supplied, for the time and number of passengers concerned, to produce an atmosphere containing the amount of vitiation indicated by the analysis of the samples taken.

The method of collecting the samples was as follows: Two ordinary cautery bulbs were used for pumping the air into the receiving bottles. The admission valves of the two bulbs were held close together and at arm's length from the operator who squeezed them. Their delivery pipes led to the bottom of two clean 8-oz. white-glass bottles. The bulbs themselves had a capacity of about 4 oz. This method insured the delivery of the samples of air to the bottom of the bottle and the forcing of the previous contents out at the neck. In accordance with the practice and recommendations of the Bureau of Mines the bulbs were squeezed at least fifty times in the collection of each sample. The use of two bulbs delivering to two separate bottles was merely to secure two samples as nearly identical as possible for check analyses in case of doubt or accident.

The samples were collected by walking slowly along the aisle

of a working car. Immediately after the collection of the samples the necks of the bottles were closed by the insertion of soft rubber stoppers of the best quality obtainable, and, at the end of the run, these were in turn sealed by dipping in a melted mixture of beeswax and turpentine. Every possible effort was thus made to insure the samples being truly representative of the average condition of the air in the car at the time they were taken. They were all obtained from cars in regular service and the positions of the ventilator openings were recorded.

While the special car was in service, the working coach next to it in the train was used to obtain the air samples, and its ventilators were arranged in the same manner as those of the special car, the only difference between the two being the location of the two cars in the train and its effect on the operation of the ventilators. The effects of this have, necessarily, been neglected.

In a report to the Master Car Builders' Association, in 1908, a committee placed the amount of fresh air that should be supplied for the ventilation of a passenger car at 1,000 cu. ft. per passenger per hour. The results of these tests show that this amount was exceeded in every instance, and that this was accomplished without producing strong air currents or drafts in the breathing zone.

CONCLUSIONS

The conclusions to be drawn from this investigation are that:

One Standard exhaust ventilator will supply sufficient air to the breathing zone to meet the requirements of four passengers on the basis of 1,000 cu. ft. per passenger per hour. Its capacity varies directly as the speed of the train up to 60 miles an hour. The actual capacity in cubic feet per hour equals the speed of the train in miles per hour multiplied by 188. This actual capacity may be taken to be about 70 per cent of the theoretical rating.

The location of the car in the train has an effect on the efficiency of the exhaust ventilator. Speaking generally, the nearer the car to the engine the higher the efficiency. There is probably no mathematical ratio determinable for this.

The location of the ventilator on the car has an effect on its efficiency. The ventilators near the ends of the car have a higher capacity than those at the center, and those at the front have a greater capacity than those at the rear.

No perceptible drafts are created by the Standard exhaust ventilators below the tops of the windows. There is a gentle movement of the air down into the body of the car, and up to the deck in a complex system of currents, that cannot be differentiated.

Smoke or noxious vapors entering the car at the deck openings do not come down into the body of the car, but are drawn out through the exhaust ventilators.

High banks, cuts or tunnels have no effect on the action of the Standard ventilator.

It is not necessary to close the ventilators when passing through tunnels.

The heating of the car near the floor is successfully accomplished.

WOMEN OPERATE GERMAN RAILWAYS.—A report received in Paris from Basle says that all the employees on the Berlin Underground Railway are now women. Women are also employed on suburban lines, where they are to be seen cleaning the cars, and even working with the picks and shovels.

MOTIVE POWER OF THE SOUTH AFRICAN RAILWAYS.—The total number of locomotives in use on the Union of South Africa Railways at the end of 1913 was 1,458, of which 1,428 were of the standard 3 ft. 6 in. gage and the remainder of 2 ft. gage. The average tractive effort of 75 per cent was 21,626 lb., and the number of locomotives of a tractive effort of over 30,000 lb. was 216. Many of the engines on the books are of an obsolete type, and are gradually being withdrawn from service.

RAILROAD ADVERTISING*

BY EDWARD HUNGERFORD
Advertising Manager, Wells, Fargo & Co.

Advertising was born—50 or more years ago—as a mere incident of the work of the general ticket agent. When that brisk officer rose a bit above the mere details of ticket selling and became general passenger agent, he still carried advertising with him as one of the smaller details of his work—a work to be actually executed by some underpaid office boy or clerk and executed after the fashion of nearly all underpaid work.

The only advertising on the part of the railroads at that time was for passenger traffic. It was rough stuff, bombastic, not logical, not even seeking to be logical. For as far as straight-from-the-shoulder advertising for traffic, or even for a public understanding of their problems was concerned—there was no such thing for the railroads. The railroads advertised "Shortest Route," "Best Route," "Most Popular Route," and, though people went and in many cases found that they were not the shortest, the best or the most popular route, what mattered it? The newspapers had been thrown a little money, and for a little time they would be quiet in their criticisms. And there were some railroads which boasted that they did not have to advertise in the newspapers or the magazines at all. One line said that its advertising appropriations went into the gay stripings of its cars and locomotives—and was quite wrong. Another put its advertising money into its service and was quite largely right—of which more in a moment. Those who put their appropriations into white paper and black ink rarely did it right. A real advertising manager around a railroad office would have been treated as a rarely humorous appendage.

Such conditions could not last, of course. The railroads themselves were the first to discover that their advertising policies were wrong. The discovery came a long time before the finding of the remedy.

It was not so very long after the close of the Civil War that the railroad lines began to multiply in the unpeopled Southwest and the Northwest. Of the possibilities of those rich and undeveloped territories no one with imagination or intelligence might doubt. All they needed for their development—and the enrichment of the railroads that had been built to serve them—was population. In the absence of any other intelligent or organized immigration force the railroads took up the work themselves.

Then it was that advertising came into its first real respect in the railroad offices of the land. It took advertising in the seventies and the eighties, even into the nineties and up to today, to build the fat farms and the fine towns, the budding cities that one sees from the car window as today he crosses Minnesota, the Dakotas, Montana, Oklahoma and West Texas. That advertising was often poor—as our advertising standards of today go—but it was thorough and generous. The results that followed it were astonishing. The response was immediate. The railroads saw that response and invested more advertising funds. The response was increased proportionately. There are counties, metropolitan cities—with trolley systems and country clubs and taxicabs and tango palaces—whole developed states in our land that are young enough to say, and say with truth, that they were builded upon the policy of American advertising.

This has also been the history of the development of western Canada by the advertising of your own railroads. Only you have had two benefits which were denied to the railroads of the United States a generation or so before. You have had the benefit of experience and you have advertised in a day when advertising has begun to come into its own.

One might expect that any profession—you may call it a policy if that suits you better—that had accomplished so much for the railroads would today have a larger recognition than has yet been given it. You might fairly expect that the man who headed

*From a paper presented before the Canadian Railway Club at Montreal, Can., on March 9, 1915.

it upon any great system would be a member of the intimate councils that govern it. Yet, unfortunately, the reverse is the more apt to be true. And no matter how advertising on the railroad has progressed, I think that I am fair in saying that the advertising manager on the railroad has not been permitted to make a similar progress. His position and his progress are hardly to be compared with those of his brethren who occupy similar posts in the staff of great manufacturing and merchandising enterprises. Those men are given every opportunity to perfect and to strengthen themselves, are recognized as the right hand members of the organization. They are "managers" in the full sense of the word. No one dares to doubt their final decision in matters affecting their branch of the conduct of the business. Neither does a railroad executive doubt the decision of the man who is handling the law business of his system—he does not even assume to criticize the contracts which this man may draw up. He does not change the structural plans for bridges or the detailed profile for a projected line across new country.

Does he do as much for the advertising manager?

You know yourselves that the times are far too few when he ever sees an advertising manager. The smart executive has many thoughts and many suggestions on advertising. Most quick-witted and alert men have—and most of their thoughts and suggestions are very good indeed. He may have, and probably does have, more than a little pride in the advertising of his road. But, in many cases, he probably has little more than a head-nodding acquaintance with the advertising manager of his line. That poor soul is "down" in the organization. He works "up" to the president through two or three intermediate executives who may or may not have any intimate knowledge or liking for advertising and who almost certainly will have widely divergent ideas as to its practical application. Frequently he has the exquisite torture of seeing his best publicity ideas so twisted and so changed before they receive the final stamp of approval from the "big chief" and go out into the world to attempt their missions, that he would not know himself these children of his own brain.

Now here is a condition not absolutely prevalent upon the North American continent, but unquestionably dominating far too many of our railroads and preventing them from gaining the fullest advantages from advertising and publicity of every sort. Before we consider the remedy let us give attention to one or two possible causes for this condition. A railroad executive, big-hearted and shrewd-headed, offers what he thinks is a good reason:

"The reason we are willing to defer to the general counsel and do not often assume to criticize him in because we realize that he is a trained man. The points he makes are the result of his specialized education and his experience. Our advertising agent is a very different sort. His book education ceased before he was done in the high school. He has come up with us in the railroad—all the way from office boy. Can you expect us to defer to his judgment or to accept it as something infallible?"

This begins to look as if we had a very definite cause formulating itself. Without losing sight of this point let us turn around and see it from the other angle—from that of the man who is handling the advertising for that very road. He is equally frank.

"Perhaps the old man is right," he admits. "I am willing to admit that one of the main troubles in advertising the railroad is in its advertising man himself. As a rule he has not been selected because of experience or ability—a good many times he has been secretary to some 'big wig' in the traffic department and the advertising job is given him because it was necessary to proffer some slight promotion to a man who has been faithful in the company's service. And eventually he will quit the advertising job. He will be too big for it—the truth is that it will be too big for him—and so he will go and another will come—leaving the whole job to be done over once again.

"The truth of the matter is that a big railroad is just like a big manufacturing concern; its operating end is the manufacturing department, while its traffic end corresponds with the sales department of a factory. One of the weaknesses of the railroad situation today is that some of its leading figures claim that the business is different from any other. There may be minor differences, but in my opinion there is a strong similarity between railroading and manufacturing.

"Yet because of this very feeling that railroading is fundamentally different from other businesses, its advertising is too frequently permitted to also become different. It is not looked upon by these men as a force that may be brought to create traffic—and this despite some of the things that I have told you already tonight—'but as merely a cut and dried, or hit and miss method of making announcements as to train service, excursion rates and the like.'

"Merchandising, like advertising, is a specialized business and requires specialized training and education. And is it to be wondered that a man who has had no special training toward the diplomatic handling of the public has little or no appreciation of the real place of advertising in the progressive business organization? And those having in charge the traffic department of a railroad should be—first of all—good sales managers. Rate clerks can be hired just as easily as an advertising manager can hire a copy writer."

Here then is the case as put by one actual advertising man. And whether we subscribe to it in full or not I think that we all can agree that he has struck at both the cause and the result in far too many railroad advertising departments today. And I do not think, myself, that there is any great problem involved in finding the solution—particularly not when we keep steadily in mind all the while what advertising has done for the railroad, how it has made trains like the International Limited, the Imperial and the Twentieth Century household words, how it has upbuilded whole townships, and counties, and states, and provinces, and so in turn upbuilded the welfare of the railroad.

Just as the legal department of the railroad is its defensive wing, so should the advertising department be its offensive. The advertising manager should sit alongside the general manager and the traffic manager, the counsel and the controller. He should be freed from the detail and left to plan the publicity of the railroad, in its every phase. It should not be alone his work to write time-tables or scurry immigrants out to new localities, to see reporters or to attempt to steal fast freights from his nearest competitor. His work should combine these things and then reach to a far higher plane, the meeting and gauging and shaping of public sentiment of which more in a moment.

The advertising manager of the railroad should be trained—he should train himself if you please—as carefully as that general counsel has trained himself. He should not himself expect to be bidden to sit at the family table without being made ready for the feast. There are plenty of educational forces that stand ready to help him make himself a better man not only for the railroad for which he works, but for the satisfaction of his own peace of mind as well. He should be not only a student of advertising and the things that pertain to advertising, but he should also be a student of changing conditions; he should be what we sometimes call a publicist.

For no matter how intelligently and successfully our railroads may have advertised for immigrants and for passenger traffic of every sort and condition I do not believe that they yet have used paper and ink to the greatest advantage to fight the most of their battles for public sentiment, in repelling the attacks of unjust legislators and commissions. They have rarely used these implements with greatest intelligence. As a rule, if they have advertised for public sentiment through newspaper advertisements, it has been an eleventh-hour measure adopted in a great crisis.

The railroads of the state of New York—splendid advertisers

for passenger traffic each one of them—united in such an eleventh-hour appeal throughout the newspapers of the state against the so-called full-crew bill, which was then before the governor of the state—a bill which would add more than $2,000,000 to their costs of operation. The "ad." was generous in proportions, but the governor laughed at it and signed the bill. He was a shrewd enough molder of public opinion to know that the railroads had thrown away their money.

On the other hand, what a different result might have been written if the railroads steadily and persistently, whether under legislative fire or in times of seeming calm, had told their story quietly and interestingly through the newspapers of the state. It would not have cost them anything like $2,000,000 a year to have brought an intelligent public sentiment to their aid. What it would have cost would have been the expenditure of thought and careful planning by one man in authority—a man trained for just such an emergency as this, plus a most moderate cash outlay for newspaper space, would have produced a campaign that quickly would have ended the "full-crew" menace in New York. In fact, this very sort of a campaign has just been waged by the railroads of Missouri against the "full-crew bill," which had also come into being in that state. Despite the fact that the bill had passed and had become operative as a law a shrewd and deliberate advertising campaign, conducted at a most reasonable cost to the railroad, succeeded in repealing it by popular vote at an election called for that purpose. And it is gratifying to see that the railroads of the United States working toward the repeal of the full-crew bills in some other states, as well as a general increase in their passenger rates are not relying upon the charity or the good nature of the newspapers for free space for the presentment of their case, but are paying for regular advertising for the shrewd, deliberate, forceful statement of their very good arguments. Three days ago the various roads operating in New Jersey, the Central of New Jersey, the Lackawanna, the Pennsylvania, the Lehigh Valley and the Erie, began a campaign in the newspapers, looking to the repeal of the full-crew bill. A similar newspaper campaign is to be carried on in New York. If the campaign in New Jersey is successful, and also against an impending measure to restrict the length of freight trains. The railroads responded to the full-crew bill by running longer freight trains. The labor unions in their turn provided a bill limiting the trains to half a mile in length. The roads are going to fight this. Personally, I am deeply interested in this matter, and I feel that if, instead of waiting for this to take place, they had had an executive, or semi-executive officer; such as the general counsel, the general manager or the chief engineer, a man, who, week in and week out, and month in and month out, had adequately told their story, and shown what it meant to the community in a straightforward and forceful manner, they would be more successful.

Perhaps they have studied the splendid results obtained by a policy of advertising of the telephone companies, a splendid example of the use of advertising of the highest type by a public utility. Perhaps they have read the printed record of the individual campaign waged by the trolley company of Toledo, or those of various traction and lighting utilities which have handled such problems and handled them intelligently.

But they could not have been handled intelligently, or successfully, by some man buried at an inferior desk of a department. They must have been handled by men who were executives, with executive work and executive opportunity—men who were paid and well paid too, to plan in the large ways that the railroad must approach not only its individual patrons, but the entire public upon the printed page. Success of this sort rarely comes in large measure except to men and institutions who go out to meet her in a large way.

To make a brief résumé—we have seen the railroads advertising for emigration, and the advertising responding magnificently to that test. The roads have used advertising also for creating passenger traffic, and I am not so sure but that they might also use it to create freight traffic, but that is open to discussion and to question. But we have not yet seen the railroads taking hold of these great questions of public policy and grasping them with the strength that some other businesses have shown. I imagine this is due to one thing, this very thing I have talked of this evening—that the advertising manager of the railroad has not compelled himself to be recognized by an executive of the railroad organization.

FEDERAL VALUATION PROGRAM

Thomas W. Hulme, general secretary of the Presidents' Conference Committee on Valuation, has issued a circular announcing that the plans of the Interstate Commerce Commission contemplate that valuation work will be commenced on the following lines between July 1, 1915, and June 30, 1917. This program is liable to change and is herein stated for the general information of all interested. Each carrier may expect to receive at least three months and possibly six months' official notice from the director of valuation of the government's intention to commence work on its line.

EASTERN DISTRICT

July 1, 1915, to July 1, 1916

Boston & Maine (complete the work); Boston & Albany; New Haven System, 1,000 miles; Pennsylvania Railroad, 1,500 miles; Central of New Jersey; Pittsburgh & Lake Erie; Bessemer & Lake Erie; Richmond, Fredericksburg & Potomac; Canadian Pacific (in Vermont and Maine); Central Vermont; Grand Trunk (Sherbrooke, Que., to Portland, Me.); Virginian.

July 1, 1916, to July 1, 1917

New Haven System (uncompleted balance); Pennsylvania Railroad; Bangor & Aroostook; Maine Central; Philadelphia & Reading; Buffalo, Rochester & Pittsburgh; Delaware & Hudson; Rutland; Ulster & Delaware; New York, Ontario & Western; Long Island.

SOUTHERN DISTRICT

July 1, 1915, to July 1, 1916

Central of Georgia; Mobile & Ohio; Southern (Eastern half of System); Cleveland, Cincinnati, Chicago & St. Louis; Georgia; Charleston & Western Carolina; Chicago, Indianapolis & Louisville; Nashville, Chattanooga & St. Louis; Pennsylvania Lines West.

July 1, 1916, to July 1, 1917

Southern; Florida East Coast; Pennsylvania Lines West; Atlantic Coast Line.

CENTRAL DISTRICT

July 1, 1915, Ann Arbor; August 1, 1915, Toledo, St. Louis & Western; August 1, 1915, Chicago, Terre Haute & Southeastern; October 15, 1915, Chicago, Milwaukee & Gary; December, 1915, New Orleans Great Northern; December, 1915, Gulf & Ship Island; December, 1915, Texas & Pacific; March, 1916, Minneapolis & St. Louis; April, 1916, Chicago Great Western; May, 1916, Green Bay & Western; July 1, 1916, Duluth, South Shore & Atlantic; November 1, 1916, Texas & Pacific; December, 1916, Louisiana & Arkansas; December, 1916, New Orleans & Northeastern; December, 1916, Louisiana Railway & Navigation Company; April 1917, Michigan Central; April, 1917, Chicago & North Western.

WESTERN DISTRICT

July 1, 1915, Santa Fe Lines East; October 1, 1916, Missouri Pacific System; October 1, 1916, Texas & Pacific.

PACIFIC DISTRICT

July 1, 1915, to July 1, 1916

Great Northern, 3,300 miles; Chicago, Milwaukee & St. Paul (West of Mobridge, S. D.), 1,600 miles; Gallatin Valley; Idaho & Washington Northern; Spokane & British Columbia; Wenatchee Valley & Northern; White Sulphur Springs & Yellowstone Park; Atchison, Topeka & Santa Fe (Coast Lines, California), 1,200 miles; Southern Pacific—Pacific System (New Mexico, Arizona and California), 1,500 miles; Arizona Eastern; Ray & Gila Valley; San Diego & Arizona; San Diego & South Eastern; Twin Buttes; Holton Inter-Urban; Tonopah & Tidewater; Las Vegas & Tonopah; Bullfrog Goldfield; Tonopah & Goldfield.

July 1, 1916, to July 1, 1917

Great Northern (Western District to complete), 2,100 miles, (Pacific District to complete), 500 miles; Chicago, Milwaukee & St. Paul (Pacific District to complete), 350 miles; Spokane, Portland & Seattle; Oregon-Washington Railroad & Navigation Company; El Paso & Southwestern System; Arizona & New Mexico; Atchison, Topeka & Santa Fe (Lines in New Mexico), 1,300 miles; Southern Pacific (Pacific System), 1,000 miles; Miscellaneous Short Lines.

Annual Convention of the Air Brake Association

Moisture in Compressed Air Apparatus and Yard Plants; Operative Freight Brakes; Pneumatic Signals

The twenty-second annual convention of the Air Brake Association was held in Chicago, May 4 to 7, as noted in the *Railway Age Gazette* for May 7, page 983. A report of the convention follows:

PRESIDENT'S ADDRESS

President Albers called attention to the lack of standardization of brake equipment for passenger cars, and suggested that a committee, composed of air brake men from both the Air Brake Association and the Master Car Builders' Association, could by careful study do much to relieve this situation. The L. N. equipment which replaced the old P. M. equipment on the heavier cars, has not given entirely satisfactory results, trouble being experienced with slid-flat wheels, hot wheels and burned brake heads, caused by "stuck brakes." On the New York Central lines it has been found necessary to operate this equipment with its graduated release feature eliminated, which made it necessary to lose two of the features for which this valve was designed, namely, quick recharge and high emergency brake cylinder pressure. The double P. M. and L. N. brake equipment have also caused trouble from "stuck brakes." The new P. C. equipment provided a temporary relief from the troubles experienced with the original valves, but Mr. Albers stated, the complexity of this equipment rendered it difficult to locate immediately and definitely defects which arose in train service. His suggestion was to have a committee work towards a simple standard valve which would be capable of being applied to all but the lighter classes of cars.

Mr. Albers also called attention to the necessity of economy in the maintenance of air brake equipment, with full consideration for safety. On the New York Central, east of Buffalo, tests have been in progress for a period of 18 months, on 18 dining cars, and to this date 16 cars are still in actual service, with an aggregate mileage of 2,321,136 miles, without once having received any attention or lubrication, except that originally applied. None of these cars have given any detention on account of the air brake equipment, nor has any valve been removed except for tests. If the cleaning period, instead of being three months as at present, was extended to four months, the annual saving to a road having 1,000 P. C. equipment cars would amount to approximately $1,640, and if the period was extended to six months the saving would be approximately $3,280. With the P. M. or L. N. type of equipment this saving would be $420 and $840, respectively.

100 PER CENT OPERATIVE BRAKES IN FREIGHT SERVICE

The committee report on this subject was presented by G. H. Wood, Atchison, Topeka & Santa Fe. An abstract of this report follows:

The general opinion is that an operative brake is one in which the piston moves out of the brake cylinder far enough to close the leakage groove, and not more than 10 in. when a full service brake application is made from at least a 70-lb. brake pipe pressure, and remains so until the usual inspection is made, and releases properly in the usual methods resorted to in making ordinary terminal tests; the only other requirement is that the foundation brake gear be connected throughout to bring the shoes to the wheels. The second consideration is the question of what constitutes 100 per cent operative brakes. Our opinion in this respect contemplates each brake in a train be operative as above stated and so connected that they may all be operated from the locomotive. This will constitute 100 per cent operative and meet all the requirements but one, namely, efficiency. The highest efficiency required to meet general conditions is that the train may be controlled by the engineer without the assistance of trainmen with the ordinary hand brake.

Unfortunately, while the requirements of efficiency reduce the difficulty of providing an operative brake, they also result in ability to control trains with a low individual brake efficiency throughout the train or a small percentage of brakes operative for service requirements, while certain other conditions automatically increase the necessary efficiency and number of operative brakes, and the greater the number of cars involved, the more pronounced are these results.

At many terminals we have no provision to charge trains and make inspection in the train yard until the engine is placed on the train. The introduction of the yard pressure lines where the train is made up sufficiently in advance of leaving time, would give an opportunity to make the brake inspection and correct many defects before the engine was placed on the train for departure.

Any one point on a large system attempting to run 100 per cent operative brakes would be immediately confronted with a prohibitive number of cars with inoperative brakes and a congestion that would cause serious delays resulting in this particular point being criticised for tying up traffic. Relief for this particular terminal could only be brought about by allowing inoperative brakes to proceed, or by increasing the amount of the brake work done at the terminals on either side. It can readily be seen that any one railroad attempting to run 100 per cent operative brakes would be placed in almost the same position as the terminal above mentioned, and the same rule in regard to relief would apply between the railroads involved.

The difficulty of establishing the practice of cleaning brakes on cars in trains at large terminals where the tracks extend over a large territory is expensive, as it is hard to get men and material to the cars and men are idle a large part of their time. But again we find that at many small terminals where very little switching is done on the train outside of changing engines and cabooses and where the repair track is close to the train yard, that air brake repairs can be made in trains successfully and economically, as the men in this case can be used on the repair tracks when no trains are in the yard. Yard air lines at these terminals are necessary to test out work of this kind and additional time allowed to trains in terminals to give the car men an opportunity to do the work before, or after, the train is switched. Yard train testing devices must also be provided at terminals in order that cars arriving in trains with brakes "cut out" may be tested to ascertain what, if anything, is wrong, and to test work on the brakes after it is completed.

After the facilities and materials are provided, then comes the proposition of procuring men who are competent and reliable to do the work or men who can be educated in a reasonable length of time. The better supervision we have, the less trouble we have from this source. One of the conditions we find it hard to overcome is the careless manner in which some of the air brake work is done.

We also find trainmen cutting out the brakes that do not release as soon as the others in the train, not waiting until the brake pipe pressure has been raised high enough to release the brakes having the best packing leathers. We find men who have a hobby of keeping the caboose brake cut out, being afraid of sliding the wheels, and others who will cut out cars and bleed them in order to make a switch quickly at some other point. We find enginemen who will cut out tender brakes because the triple does not release promptly or because they are afraid of the hangers breaking, and others who will insist on having the piston travel let out beyond the limit on cars, claiming that the brakes drag—this particularly with small engines. Cars are found with the brake "cut out," and on testing out nothing is found wrong, except that the retainer is turned up, and others with nothing but

a leak at the triple valve union, requiring only a turn of a wrench to stop it. All of these things work against the percentage of operative brakes and are irregularities against which a crusade would have to be waged on every division of every railroad concerned. Some form of defect card must be adopted to be applied by the man cutting a brake out on the road, showing who cut it out and for what reason.

A system must be inaugurated to catch the disabled brakes as soon as practicable after the defect becomes apparent. With this in view, what might be called "dead lines" should be designated at reasonable distances over the road—terminals where facilities are the best, as 100 per cent points where no brakes that are inoperative are allowed to pass, regardless of lading. At all terminals where there are facilities, dead freight loads and empty cars with inoperative brakes should be caught and repaired. All cars on repair tracks should have their brakes carefully tested, and if the cleaning date is over nine months old on home cars, the brakes should be cleaned. This would avoid the necessity of putting the car on the repair track again in so short a time, and when it might possibly contain an important load.

If we wait until the trains are made up in the yard to make inspections we will have delays and bad cars, but if we require the men on all incoming trains to have the train fully charged and then make the required application of brakes before cutting off, the air brake inspection can be made at the time of usual train inspection, and any cars "bad ordered" can be switched out in the usual switching time.

The question arises as to what is to be gained by increasing the number of operative brakes. One reason is to provide a wider margin of safety by the ability to stop in a shorter distance in cases of emergency. The reason more frequently encountered, however, is the resultant reduction of slack action in long trains, which contributes largely to troubles arising from break-in-twos.

Discussion.—F. B. Farmer, of the Westinghouse Air Brake Company, strongly recommended the employment of general car brake inspectors, whose duty it would be to instruct and demonstrate to the cleaners of the freight car air brake equipment how they should do their work, and to check them in their work, thus relieving the car foremen, who in very many instances are not sufficiently familiar with air brake work. He spoke strongly in favor of the incoming tests of the car brakes. This will eliminate a lot of trouble and delay that would otherwise be caused when the brakes are found defective on the outgoing tests. He called attention to the tendency for some of the comparatively level roads to absolutely neglect the maintenance of the retaining valves. This causes a great deal of trouble for roads operating in the mountainous districts, and greatly interferes with the expeditious transportation. In speaking of the "dead line," as described in the report, he stated that at one point on a large road that operated this dead line system, 75 per cent of the brakes cleaned had not run over nine months, showing that this work is not always done as carefully as it should be. Lack of knowledge and hurried work have been a great factor in the improper maintenance of brakes, and many times are the basis for charges of dishonesty in doing the work.

Some roads are having good success with "carding" freight cars with inoperative brakes, permitting them to go to the next terminal. The train men have also been instructed to place "defect cards" on the cars as they become inoperative on the line, and also on those cars that are picked up en route. Considerable educating has to be done to get the men to do this, and only by the assistance of the transportation officials can it be satisfactorily accomplished.

Walter V. Turner, chief engineer of the Westinghouse Air Brake Company, encouraged the members to do all in their power to influence their superiors to give them the proper facilities for keeping the brakes in good condition. Absolute persistence and nerve in carrying out what they believe to be absolutely necessary in the maintenance of brakes is required to get the right results.

ELIMINATION OF MOISTURE FROM YARD TESTING PLANTS

Mark Purcell, Northern Pacific, chairman of the committee on this subject, presented a description of the air cooling plant of the New York Central at the Mott Haven yards in New York City. This plant was installed for the purpose of eliminating the moisture from the compressed air before it was distributed throughout the yards and thus prevent freezing of the air lines, and insure dry air being supplied to the equipment in the yards. The compressors feeding these yards have a capacity of 2,500 cu. ft. of free air per minute. The cooling plant was built on the basis of 3.2 running feet of ¾-in. pipe per cubic foot of free air consumed by the compressor. It is divided into 48 sections, each section having two headers, and 18 pieces of the ¾-in. extra heavy galvanized pipe about 112 in. long. The upper headers are 6 in. in diameter and the lower ones 8 in. in diameter, both being made of extra heavy wrought iron. The 48 sections are arranged in two groups of 24 each, and are so arranged that all the piping is accessible, and sufficient space is provided for the circulation of the atmosphere around the cooling pipes. The air is first received from the compressor into two large storage reservoirs, 4½ ft. in diameter by 11 ft. high. The plant is so arranged that the air may be delivered direct from these reservoirs to the yard or direct through the cooling plant. A roof has been erected over the plant to protect it from the snow in winter and the hot sun in the summer. The plant gives satisfactory service, and from numerous tests made throughout the yard it has been ascertained that it will deliver dry air under all conditions.

Discussion.—Those roads that have not such an elaborate cooling system have found that very good results can be obtained by placing drain reservoirs in the yard piping to catch the moisture as it becomes condensed in the pipes, these reservoirs to be drained twice a day. It was also pointed out that the compressor should have its intake located outside the building where it could obtain as cold air as possible.

The discussion also developed into the consideration of the accumulation of moisture in the air on the locomotive. Briefly summarized, it was believed that sufficient radiating surface should be provided between the compressor and the brake valve, and where possible two main reservoirs were recommended, one of which to be used as a drain for the air system. On large Mallet locomotives it was found expedient to use three main reservoirs. It was also shown that where the compressor or the storage capacity was not great enough to provide the necessary air for operating the train, and where such air was, of necessity, taken directly from the pump without having time to cool, considerable trouble was experienced with moisture in the train line. It was also pointed out that very good results could be obtained by leaving all drain cocks open on the engine and tender during the time the engine is in the roundhouse. In some cases the centrifugal dirt collectors have been found to be of advantage as drains for the train line.

OPERATION OF THE PNEUMATIC SIGNAL DEVICE

The committee report on this subject was presented by L. N. Armstrong, Pennsylvania Railroad, who said in part: Possibly the largest factor in the correct operation of the signal device is maintenance. This is particularly true of the amount of leakage allowed in the signal line. Excessive leakage will destroy the confidence of the crew in the signal system. In order to get the best results the location of the pipe and hose should be as recommended by the M. C. B. Association. In endeavoring to improve the operation of the pneumatic signal system it is necessary to first ascertain the conditions under which the signal is operated. Tests should be made with a recording gage attached to the signal line on the rear car of a train by which can be determined the pressure carried in the signal line, all reductions in this pressure, whether made by pulling the cord or by the hose coupling leaking when passing over crossovers, switches, etc.; and the time required to recharge the line after reductions have been made. It has been found necessary for the train men to make the reductions at the car discharge valve of not less than one second

duration, and pause between the reductions from two to three seconds, or approximately three times as long as the time of reduction. On the longer trains it is necessary to increase this time interval between the blasts. It is believed that the electro-pneumatic signal, which does not have the limitations of the present pneumatic signal, will eventually be adopted. A steam train thus equipped has been in regular service during the past year, covering 180 miles a day with good results.

The construction of the signal valve is such that very careful workmanship is required in order to have the correct clearance between the valve stem and its bushings. The manufacturers have investigated the permissible leakage for signal valves with various sized orifices venting to the atmosphere. Valves which have passed the standard tests using no orifice, passed also when the leakage was six pounds per minute. The results of these tests show that in order to affect the signal valve operation at all, leakage must be excessive and above the amount which should be permitted in service. The committee report also included the method of testing signal valves as used by the Central Railroad of New Jersey at the Elizabethport shops.

Discussion.—The consensus of opinion as to the pneumatic signal was that in its present state it is not an absolutely reliable device. On long trains considerable trouble is experienced with leakage. Where trains are over 18 or 20 cars long, it was believed expedient to increase the signal train line pressure to 60 lb., and on such trains in giving signals from the last car the valve should be held open longer and greater intervals should be allowed between the blasts than on short trains. It was believed that the electro-pneumatic signal system would be of much more value and would give the necessary reliability that should be required in a signal system between the locomotive and cars. Greater care should also be taken in the proper maintenance of the present pneumatic system. Mr. Armstrong, in closing his paper, stated that electric energy sufficient to operate an electro-pneumatic system could be obtained from dry cells or from the electric lighting system on the cars or locomotive.

OTHER BUSINESS

A committee report was also presented on hand brakes for heavy passenger cars in which the need for more efficient hand brakes for heavy passenger equipment cars was shown. This is not to enable the train crew to stop a train at high speed, but rather to enable the switching crew to properly control the cars in yard movement. The present equipment is only good for holding the cars after they have once been stopped. The subject was continued to report at the next convention.

The customary report on Recommended Practices was also presented.

During the convention an afternoon was given to the air brake appliance supply men, who talked to the members concerning their products. On Thursday afternoon the association was addressed by Walter V. Turner, of the Westinghouse Air Brake Company; N. A. Campbell, of the New York Air Brake Company, and J. R. Snyder, of the Pittsburgh Air Brake Company. Mr. Turner spoke of the developments during the past year, and told how the New York subway had increased its capacity by the adoption of the electro-pneumatic brake. Mr. Campbell gave an illustrated talk on the New York electro-pneumatic air brake. Mr. Snyder gave an illustrated talk on the new air brake equipment furnished by his company, laying particular stress on the "No-kicker" attachment.

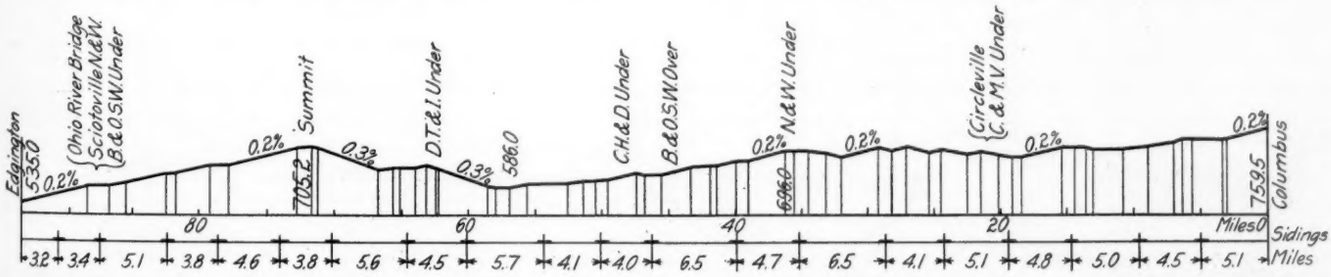
The association was also addressed by E. H. De Groot, Jr., superintendent of transportation, Chicago & Eastern Illinois, and M. H. Haig, mechanical engineer, Atchison, Topeka & Santa Fe.

The following officers were elected for the ensuing year: President, J. T. Slattery, Denver & Rio Grande; first vice-president, T. W. Dow, Erie Railroad; second vice-president, C. H. Weaver, New York Central lines west of Buffalo; third vice-president, C. W. Martin, Pennsylvania Railroad; secretary, F. M. Nellis, Westinghouse Air Brake Company; treasurer, Otto Best, Nathan Manufacturing Company. The executive committee is as follows: T. F. Lyons, New York Central lines west of Buffalo; J. F. Barry, New York, Ontario & Western; L. P. Stretter, Illinois Central; Mark Purcell, Northern Pacific; G. H. Wood, Atchison, Topeka & Santa Fe.

It was voted to hold the next annual convention at Atlanta, Ga., on May 2 to 5, inclusive.

NEW LINE OF THE CHESAPEAKE & OHIO NORTHERN

Contracts have been let for the grading and masonry work on 29.8 miles of the Chesapeake & Ohio Northern from Edgington, Ky., to a point near Waverly, Ohio, as mentioned from time to time in our news columns, and the contractors are now moving in and installing their equipment. This company, as a subsidiary of the Chesapeake & Ohio Lines, was organized to build a road from Columbus, Ohio, to Edgington to connect the Hocking Valley with the main line of the Chesapeake & Ohio, but the difficulty of securing funds at a reasonable rate of interest at the present time has made it inadvisable to undertake the construction of the entire mileage for the present. It is planned to connect with the Norfolk & Western near Waverly temporarily and to secure trackage rights over that company's lines into Columbus.



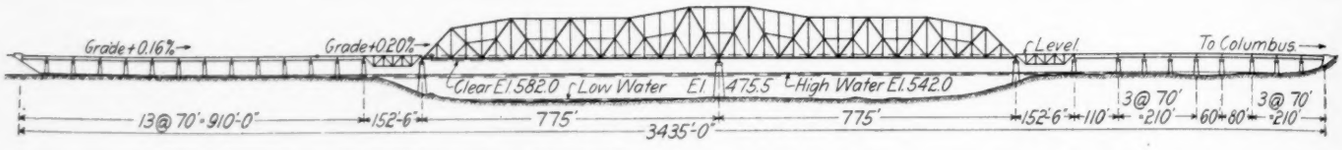
Condensed Profile of the Chesapeake & Ohio Northern, Showing the Entire Line Between Edgington, Ky., and Columbus, Ohio

Starting at Edgington on the south bank of the Ohio river, the new line will swing to the north crossing the river just east of Sciotoville, Ohio, also crossing the Norfolk & Western and the Baltimore & Ohio Southwestern near this point. The temporary connection with the Norfolk & Western is made just south of Waverly on the east bank of the Scioto river, this stream being crossed by the existing line at Waverly and again at Chillicothe. The proposed route then follows the eastern bank of the river for the entire distance to its connection with the Hocking Valley just south of Columbus. It will cross the Detroit, Toledo & Ironton near Waverly, the Cincinnati, Hamilton & Dayton, the Baltimore & Ohio Southwestern, and the Norfolk & Western near Chillicothe, and the Cincinnati & Muskingum Valley at Circleville, the grades at all of these crossings being separated. The maximum grade will be 0.2 per cent compensated northbound and 0.3 per cent southbound.

The construction of the first section of the new line will require the excavation of approximately 3,000,000 cu. yd. of earth and 590,000 cu. yd. of rock, or an average of 120,000 cu. yd. per mile. About 52,000 cu. yd. of concrete, 500,000 lb. of reinforcing

steel, 40,000,000 lin. ft. of timber piling, 700 tons of cast iron pipe and 2,000 tons of structural steel will be required The line will be laid with 90-lb rail and creosoted ties on crushed limestone ballast

The bridge over the Ohio river is the most important piece of work on the line, the substructure of this bridge being now about one-half completed. The structure has a total length of 3,435 ft., consisting of two main channel spans of 775 ft. each, a south approach of 1,062 ft. 6 in., and a north approach of 822 ft. 6 in. The channel spans are through truss structures with sub-diagonal systems. The south approach consists of one 152-ft. 6-in. deck truss and thirteen 70-ft. deck girder spans, while the



Elevation of the New Ohio River Bridge of the Chesapeake & Ohio Northern, Near Sciotoville, Ohio

north approach includes a 152-ft. 6-in. deck truss span and deck girder spans of various lengths from 60 ft. to 110 ft. A clearance of 40 ft. above high water is provided, the variation between low and high water at this point being about 66½ ft. The substructure of the bridge consists of concrete piers and abutments. The alinement is on a tangent across the river and the north approach, with a 1 deg. 15 min. curve on the south approach.

The next most important structure on the line is the crossing of the Little Scioto river about two miles north of Sciotoville. This structure has a total length of 1,080 ft., and consists of eight steel towers and one rocker bent supporting 40-ft. tower girders and 80-ft. intermediate girders. The maximum height at the stream is about 100 ft. In addition to this there will be numerous plain and reinforced concrete arch and box culverts and highway structures of various designs. The small drainage openings will be cast iron pipe with concrete headwalls.

The grading and masonry contracts were awarded to W. W. Boxley & Co., Roanoke, Va., the Rinehart & Dennis Company, Charlotteville, Va., Winston & Company, Richmond, Va., and Robert Grace Contracting Company, Pittsburgh, Pa. The substructure of the Ohio river bridge is being built by the Dravo Contracting Company, Pittsburgh, Pa., and the superstructure is contracted to the McClintick-Marshall Company, Pittsburgh, Pa. This line is being built under the direction of M. J. Caples, vice-president, and William Michel, chief engineer. The Ohio river bridge is being built under the supervision of Gustav Lindenthal, consulting engineer, New York City.

Pullman Service on English Railway Withdrawn.—With a view to economizing coal, all the Pullman cars running on the London, Brighton & South Coast, except those on the "Southern Belle," were recently withdrawn.

HAND BRAKES OUTLAWED

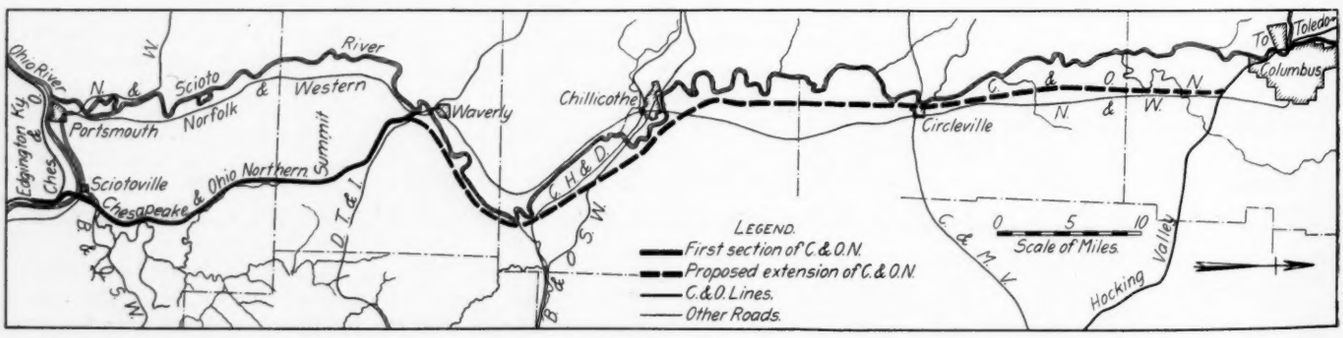
The decision of the United States Circuit Court of Appeals, Fourth Circuit, at Richmond, Va., May 4, briefly reported in our last issue, page 981, holding that the use of hand brakes to control the speed of trains in ordinary service is illegal, was written by Judge Martin A. Knapp, who was for years chairman of the Interstate Commerce Commission and who is thoroughly familiar with all phases of the federal laws affecting railroad operation. The decision is concurred in by Circuit Judge Woods and District Judge Waddill. The train operations of the Virginian Railway, which were the basis of the prosecution by the government, took place in July, 1912. The final arguments before the Circuit Court of Appeals were made November 30 last. The decision confirms that of the District Court at Lynchburg.

Judge Knapp's decision is in substance as follows:

The Virginian Railway was constructed primarily for the transportation of coal at low cost, and unusual expense was incurred to secure favorable grades and permit trains of great length. It appears to be a common practice to operate trains of 100 cars, each carrying approximately 54 tons. These trains are said to exceed in tonnage, if not in number of cars, the trains in ordinary use on any other road in the country.

From Goodview to Huddleston, Va., 13 miles, there is a descending grade to the east, which is the direction of the loaded movement, varying from nearly level to a maximum of 31.68 ft. per mile, with heavy cuts and fills and numerous curves. At the time mentioned the roadbed was not firmly settled and more or less trouble was experienced from the unstable condition of the fills and the sliding of earth and rocks in the cuts. On this account trains were limited by order to a speed of 5 miles an hour at one point and 10 miles an hour at other points. It was found, however, that these very long trains could not be operated safely, at the slow rate of speed required on this grade, when air brakes only were used for their control. This was because air brakes could not be applied with needed effect, if at all, without exerting a pressure which would stop the train, or, if released before the train came to a standstill, would cause such a jerking and surging of the train as to break the train apart; and accidents of this kind were of frequent occurrence. To avoid this danger the company decided upon the use of hand brakes, and accordingly, in May, 1912, promulgated the following order:

"In order to avoid breaking knuckles, pins and couplers in eastbound 100-car trains coming down the six-tenths grade between Goodview Tunnel



Map of the Chesapeake & Ohio Northern, Showing the Portion Under Construction Connecting the Chesapeake & Ohio and the Norfolk & Western, and the Proposed Extension to a Connection With the Hocking Valley at Columbus

and Huddleston, these trains will be held with hand-brakes and the independent engine brake.

"As a general proposition hand-brakes should be set about as follows: Goodview Tunnel to Westgate, 15 brakes; Westgate to Moneta, about 5 brakes; Moneta to Huddleston, about 20 brakes.

"If these brakes do not hold the train sufficiently, additional hand-brakes will be set up, or the independent engine brake used.

"The automatic air brakes will be used if it is seen that the hand-brakes are not holding properly, to make a quick stop on account of being flagged, or in other cases of emergency."

Trains were operated under this order and substantially according to its requirements.

It appears to be conceded that trains of a smaller number of cars could be safely operated on this section of road, even at the slow rate of speed stated, by using only the air brakes and the locomotive power brake. Just how many cars could be handled without the use of hand-brakes is not altogether certain, but apparently there was no difficulty with trains of 50 cars, or even more than that number. In short, the alleged necessity for requiring hand-brakes to be used resulted wholly from the extreme length of the trains, coupled with the low rate of speed at which they were moved.

Was the use of hand-brakes under such circumstances a violation of the federal statute? The original act, approved March 2, 1893, provides that ". . . it shall be unlawful . . . to run any train . . . that has not a sufficient number of cars in it so equipped with power or train brakes that the engineer on the locomotive can control its speed without requiring brakemen to use the common hand-brake for that purpose." The later amendment of 1903 includes this provision:

"That whenever, as provided in said act, any train is operated with power or train brakes, not less than 50 per centum of the cars in such train shall have their brakes used and operated by the engineer of the locomotive drawing such train." [Later modified to 85 per cent.]

The question asked above must be answered in the affirmative. In our judgment the legislation here considered manifests the plain intention of Congress to require the control of trains in ordinary line movement by the train brakes prescribed, and to make unlawful the use of hand-brakes for that purpose. True, the use of hand-brakes is not in express terms prohibited, but this is the necessary implication of the language used and it admits of no other reasonable construction. It was the evident purpose of the train brake provision to prevent the danger resulting from the operation of hand-brakes on the tops of cars in moving trains. In Erie R. R. Co. vs. U. S., 197 Fed., 287, the court took occasion to say that the purpose of the act "was to compel railroads to equip trains in interstate transit with air brakes, thereby contributing not only to the safety of passengers and crews, but saving brakemen, as far as possible, from the dangers incurred in manipulating hand-brakes."

The whole argument of plaintiff in error rests upon the proposition that, since the statute requires that all cars be equipped with hand-brakes, and does not expressly forbid their use for controlling the speed of trains, there is left to "the judgment or discretion of the men operating the trains the decision as to when and under what circumstances the power brake should be used, and as to when and under what circumstances the hand-brake should be used." It is obvious that such a construction would practically nullify the train brake requirement and take all effective meaning from the provision which makes it unlawful to run "any train" unless the locomotives and cars are so equipped that the engineer can control its speed "without requiring the brakemen to use the common hand-brake for that purpose." The contention must be rejected as clearly unsound. It is impossible to believe that the Congress compelled the equipment of locomotives and cars with the appliances specified in the act, for the declared purpose of doing away with the dangerous operation of hand-brakes, and then left it to the carriers themselves to decide when and under what circumstances those appliances should be used.

On the contrary, we deem it beyond doubt that the duty imposed by the provision here considered is mandatory and absolute. There is no express or implied qualification, which in any way relates to the question at issue, and it is not for the courts to introduce an exception which the Congress did not see fit to make. The peculiar and unusual conditions which existed on this section of defendant's road cannot be permitted to excuse an avoidance of the positive requirements of the act. Moreover, those conditions disclose no emergency or extraordinary difficulty. They simply show that the defendant, for the sake of convenience or economy, deliberately ordered the use of hand-brakes in the daily and customary operation of its trains. The justification set up is that trains of 100 cars cannot be moved on this stretch of track, at the slow speed of 10 miles an hour or less, and kept under safe control with the use only of the prescribed power brake. But those operating conditions, which occasioned the need of hand-brakes, are evidently of defendant's own creation. All it has to do to comply with the law is to make up trains of such smaller number of cars as can be safely and properly handled without resorting to the use of hand-brakes. In short, the mandate of the Congress is disregarded in this instance not because compliance involves any physical difficulty which is inherent or practically serious, but merely because it involves some increase of expense. It is too plain for argument that no such reason can serve to condone disobedience to the command of the statute. . . . We are of opinion that the case was correctly decided in the court below and the judgment will therefore be affirmed.

WESTERN RATE ADVANCE CASE

The hearing before Commissioner Daniels at Chicago in the western freight rate advance case, which was expected to have been concluded on Monday of this week, was extended to permit the introduction of unfinished testimony both by representatives of the protestants and the railroads, after it had been announced from Washington that the hearing on the proposed increases in passenger fares on the western roads originally set for May 17, would be postponed until July 6, at the request of the western state railway commissioners.

Testimony of the protestants against the advances in rates on livestock was completed on May 5. A large number of stock raisers from Iowa, members of the Corn Belt Meat Producers' Association, protested against any advance in the rates on livestock on the ground that the business of feeding stock for the market is no longer profitable, but is carried on in the interest of conservation of soil fertility, and therefore is a vital benefit to the agricultural welfare of the country. The farmers also testified that the service given livestock shipments has not improved in recent years, but that schedules in many cases have been lengthened, and they also objected to the accommodation furnished to caretakers of livestock. S. M. Corrie, president of the Corn Belt Meat Producers' Association, said that instead of trying to burden an industry in a critical condition it would be to the interest of the railroads to aid in fostering and building up the livestock business, not only as a means of replenishing the meat supply, but also as the most effective agent in renewing the fertility of the soil. Henry C. Wallace, editor of a farm paper, also urged special encouragement of the industry, saying that the transportation of livestock should be treated by the railroads as the grocer treats sugar, as a staple upon which no profit is expected.

T. W. Tomlinson presented some statistical testimony on behalf of the American National Livestock Association, the Cattle Raisers' Association of Texas and the National Wool Growers' Association. Later Mr. Tomlinson presented a vigorous protest against the introduction of testimony by C. W. Hillman, a cost accountant, put on the stand by the western state commissioners to testify as to the cost of handling livestock. Mr. Tomlinson said he believed Mr. Hillman's exhibits were full of errors and did not reflect correctly the earnings, profit or cost of livestock

traffic. The objection was overruled by Commissioner Daniels on the ground that it questioned the weight and not the admissibility of the evidence.

The subject of cost accounting was given a new prominence in the case when F. H. Millard, formerly connected with the Wisconsin Railroad Commission, and now specially employed by the Interstate Commerce Commission, was put on the stand as a witness for the commission to testify to a cost analysis he had applied to most of the commodities affected by the proposed advances in this case for the Chicago & North Western and the Rock Island Lines. Witnesses for the shippers had previously introduced cost figures for grain, packing house products and livestock, based on conflicting theories which had been objected to by the railways as being full of inconsistencies and errors. Mr. Millard's method, which has been used by the Wisconsin Railroad Commission, attempted to apportion the cost of transporting various commodities and then added a proportion of the return on the property investment based on the value of the commodity. The application of this system to the principal commodities involved in the case on the two roads for the average haul of each commodity resulted in figures higher in almost every instance than the actual earnings of the railroads under the present rates. Rates made on the basis here deduced, he said, would add about $6,500,000 to the revenues of the Rock Island system on carload business, allowing a 7 per cent net return on the value of the property; and about $1,817,000 to the carload revenues of the North Western.

Mr. Millard presented an exhibit outlining his system, with an express disclaimer that the figures presented are necessarily determinative upon the testimony introduced in this case. The method was based on the assumption that the value of the commodities affords a basis for distributing the reasonable return above the cost and that a given commodity is expected to pay above cost a return of 4 per cent plus an additional 1 per cent for each $10 of value per ton, considering the transportation for an entire year. A table showed that for articles with a value of $2 or less per ton, there should be a return equal to 4 per cent on the property devoted to the hauling of that commodity. For commodities valued at from $2 to $5 a ton the return would be 4½ per cent; from $5 to $10, 5 per cent; $10 to $15, 5½ per cent and from $15 to $25, 6 per cent. From this point 1 per cent was added for every $10 of additional value per ton to a maximum of 25 per cent on a value of $205 and over per ton. He said he had checked his method by applying it to all carload business on the Chicago & North Western, adding the present revenue on less than carload business, obtaining a return on the book value of about 6½ per cent.

Mr. Millard first separated freight and passenger expenses, using the basis used in the exhibit filed by L. E. Wettling, accountant for the carriers in this case, except that loss and damage to freight were excluded from the computation of unit costs and the actual amount paid was included in computing the theoretical rate for particular commodities, and 2 per cent of the total freight operating expenses were credited to the freight service, and the same percentage to passenger service to care for the net amount of traffic carried by freight trains for passenger service over the amount of traffic carried by passenger trains for the freight service. Taxes, joint facilities and miscellaneous rents were divided between freight and passenger on the basis of the percentage of operating expenses, and actual amounts were used for hire of equipment. He then separated the road haul expenses and terminal expenses, assigning the road haul expenses to the various commodities on the basis of gross ton miles, including the load, tare and the proper proportion of the empty haul of cars for each commodity. Terminal expenses were assigned to the commodities, one-third on the basis of gross tons handled and two-thirds on the number of cars handled. He then made a mathematical computation of the cost of handling various commodities on the gross ton-mile basis, and computed theoretical rates in cents per hundred pounds for distances up to 1,200 miles, for various net loads. The additional percentages for net return were computed on the value of the property apportioned between the commodities on the basis of ton miles.

According to this method he calculated that coal rates should provide a net return of 4½ per cent; hay 6 per cent; grain 7 per cent; grain products 8 per cent; fruits and vegetables 7 per cent; livestock 19 per cent and packing house products 25 per cent. Witnesses for the packers had asserted that the value of the commodities should not be taken into consideration in fixing rates, except as it affects the liability.

He then presented tables giving the actual cost, including operating expenses, taxes, hire of equipment, joint facilities and miscellaneous rents and his theoretical rates made by adding the percentage of return for distances up to 1,200 miles on each commodity, with figures showing the average haul for each commodity and the actual revenue per ton mile received by the carriers. For the average haul his theoretical rates in cents per ton per mile compare with the actual rates on the two roads, as follows:

	Rock Island		C. & N. W.	
Commodity	Theoretical	Actual	Theoretical	Actual
Grain	.676	.650	.607	.745
Grain products	.827	.561	.725	.448
Hay	1.044	.937	.939	.978
Fruits and vegetables	.940	.759	.931	.809
Live stock	1.921	1.388	1.516	1.313
Packing house products	1.714	.966	1.594	.975
Bituminous coal	.708	.592	.610	.524
Coke	.695	.504	.712	.578

Mr. Millard was subjected to a vigorous cross-examination by representatives of the western state commissioners and by attorneys for the shippers. C. C. Wright, general solicitor of the Chicago & North Western, confined his cross-examination to an effort to elicit as much detail as possible regarding the various methods of computation used. On cross-examination Mr. Millard said that the gross ton-mile basis of computing costs was far more correct than the car-mile basis or the net ton-mile basis which had been used by witnesses for the protestants, saying that the car-mile basis neglects the effect of the loading per car, while the net ton-mile basis neglects the weight of the car. He said that for the Rock Island Lines he had apportioned 62.46 per cent of the total expenses to freight and for the North Western 66.55 per cent, and that he had divided the property account between freight and passengers on the basis of an adjusted division of operating expenses. Asked whether he would advance rates to correspond with changes in price, he said that this should be done only at long intervals; that it was not necessary to allow for temporary fluctuations.

Testimony introduced by W. J. Lauck on behalf of the western state commissioners, brought forth a vigorous objection by Commissioner Daniels that time was being wasted with irrelevant testimony. Mr. Lauck, who had been one of the principal witnesses for the engineers' and firemen's brotherhoods in the recent arbitration proceedings, was put on the stand to introduce similar testimony purporting to show the increased productive efficiency of railway employees and the past history of land grants and stock issues of the western roads, arguing that high expenses of railway operation have been more than offset by the productive efficiency of labor and a resulting great increase in the economical operation of the railroads. At one point Commissioner Daniels ordered one of his statements struck out of the record as being mere surmise. "Has he not the right to give his opinion?" asked one of the attorneys for the shippers. "No, he has not the right," replied Commissioner Daniels, "to give us a lot of superfluous surmise which has no more to do with the reasonableness and justice of these rates than 100,000 other facts which might be taken out of the Encyclopedia Britannica. I am very considerably irritated that the commission is being held here simply to kill time which is allotted to you gentlemen for putting in evidence bearing upon the justice and reasonableness of these rates, or their injustice and unreasonableness if that be so."

U. G. Powell, rate expert of the Nebraska Railroad Commission, introduced some additional exhibits giving figures on prop-

erty investment, income accounts, operating revenues, expenses and taxes of the western railways. He presented tables for 10 roads to show that the average ratio of net income to property investment for 25 years was 5.86 per cent in the northwest, while for the southwest the average was 3.76 per cent. Dr. M. O. Lorenz, statistician for the commission, brought out on cross-examination that his figures showed a gain in rate of return for a long period of years, but a reduction in recent years. The witness ascribed this to increases in the various property accounts.

M. A. Chambers, an accountant for protesting shippers, took the stand to criticize some of the exhibits introduced by L. E. Wettling for the railways on the ground that certain railroads had been omitted. On cross-examination Mr. Wright showed that with the exception of the Great Northern, Northern Pacific and Union Pacific, which lie mostly outside of the territory affected by the advance, all of the roads were unimportant, many in the hands of receivers, and some of them so small that witness said he could not find them on the map.

W. W. Manker, assistant traffic manager of Armour & Company, testified in opposition to the proposed advances in rates on fertilizer from Gulf ports to the central Mississippi valley.

On Monday, J. Pease Norton, a bond expert, testifying for the western state commissioners, presented an exhibit of 137 pages containing a series of tables of bond yields to show that the credit of the railways, as measured by the yield which the public is willing to accept on their securities, has been improving in comparison with government and municipal bonds and public utility and industrial securities. "The true test of the effect of the general financial situation," he said, "would be the pure money rate on long term securities were that figure obtainable. The next best test is the closest approach we have to the pure money rate, represented by government securities and the bonds of the highest class of municipalities. If the yield upon the bond of a company engaged in private business increases faster than the pure money rate, then that is evidence that the credit of the company has declined. If the yield has increased in a less proportion than the pure money rate, then that shows that the credit of the company is on a better plane."

To represent the closest possible approximation to the pure money rate he took the government securities of England, France, Germany and the United States, and the municipal bonds of the 20 largest cities of the United States, and then made comparisons with the yield on railroad bonds for the period 1900 to 1914, showing that the yields had increased as follows:

	1900	1914	Per cent increase
Governments	2.83	3.33	17.7
20 cities	3.2	4.2	31.3
Western roads	3.9	4.4	12.8
Southwestern roads	4.7	5.1	8.5
100 railroad bonds	4.3	4.8	11.5

During the same period Mr. Norton said the pure money rate approximation had increased from 3 to 3.25 per cent and the yield on all the bonds for which he had made computations had advanced 31 per cent.

Comparing railway bonds with industrial and public utility bonds, he said that 13 railways in the western district having revenues of $1,000,000 or more, have issued 4 per cent bonds since 1910, while out of 124 bond issues of public utility companies since 1910 only 6 were at 4 per cent and one of these was guaranteed by the Southern Pacific. But two issues out of 103 by industrial companies having gross revenues of $1,000,000 or more, were at 4 per cent and both issues were guaranteed by railroads. Out of a list of 235 public utility and industrial bonds quoted on the New York exchange, one was a 3½ per cent issue, 21 were 4 per cent, 1 was 4.4 per cent, 17, 4½ per cent, 135, 5 per cent, 58, 6 per cent and 2, 7 per cent.

The shippers' advocates concluded their testimony on Wednesday afternoon, the 12th. The railroads then put on the stand a few witnesses to rebut testimony given by shippers, and it was expected that the hearing would be finished on Thursday.

SAFETY FIRST WORK ON THE SOUTHERN PACIFIC*

By W. H. Whalen,
Division Superintendent, Southern Pacific.

The Pacific system's safety record for five years shows a passenger movement equal to *eight billions* of passengers carried one mile, and without a single passenger fatally injured in a train accident. . . .

To attain the desired safety, the employees of the different divisions of the system have formed themselves into working organizations, known as safety committees. We meet once a month on each division, at which time we sit one or two days considering the different accidents that have occurred during the month, and studying their causes. We also consider suggestions made by the various employees, the number of these suggestions running as high as 220 in some months. Last month we had 125. Each suggestion is weighed carefully and recommendations are made to carry out those considered practicable; some are laid before the management for consideration. To put these suggestions into effect, our company has spent for the year ending June 30, 1914, $42,000, with pending expenditures of $85,000. As a result of one of these suggestions, this company built a subway at the Los Angeles shops, costing $7,000, that employees might go to and from their work under the tracks, rather than crossing over them and experiencing danger from passing trains. In addition, this company has spent $156,000 a year for special officers to assist in controlling the trespassing feature; $150,000 in eliminating grade crossings; $44,000 in protecting 112 additional crossings with alarm devices; $230,000 in providing crossing protection, and $17,000 in installing 40 wigwag signals at crossings; which, with the money expended in carrying out safety suggestions, amounts to $724,000. This is not all, as our signal construction and reconstruction during the past year amounted to $246,400, and their maintenance and operation $417,200, making our total investment in block signals $3,485,000. Eleven additional interlocking plants were installed during the past year at a cost of $160,000. Our fire protecting equipment is valued at $510,000 and the report of the Interstate Commerce Commission for the year 1914 shows that the Southern Pacific excelled all other lines in the United States in miles of road protected by the automatic block system employing electric track circuits.

Forty-one per cent of all of our passenger cars are of all-steel construction, the balance being steel underframe and wooden cars. Only steel cars have been ordered since 1906. Thirteen per cent of all our freight cars are steel, and 53 per cent have steel underframes. During the past year, 1,224 shop machines and tools were furnished with protecting guards and devices, and 1,906 have been so equipped during the past two years.

Our clubs for employees represent an investment of $400,000; their annual maintenance and operation costs $18,000, and approximately $1,000,000 is expended in our hospital system, with an annual maintenance expense amounting to $300,000. The Harriman Research Laboratory was instituted at an expense of $60,000.

The creditable performance in handling passengers shown by the company's records is not traceable alone to this outlay of money, but is due also to the fact that those passengers were entrusted to a thoroughly trained corps of employees who have been trained to think and act in common and in accordance with the standard code of rules. Numerous surprise tests are made by officers of the company, that we may know that the rules are being observed. It requires great effort and self-denial on the part of officers to make the surprise tests, as the work is generally done in the night.

*From an address presented at a number of schools in Southern California.

General News Department

The House Committee on Public Utilities of the Illinois legislature has voted not to report the bill to limit the length of freight trains to 50 cars.

The Wheeling & Lake Erie, on the trains leaving Cleveland for Wheeling at 9 a. m., and Wheeling for Cleveland at 5:05 p. m., runs buffet dining cars on which both the cooks and the waiters are women.

The railroad commission of California has issued an order authorizing the Colusa & Lake Railroad, operating between Colusa and Sites, Cal., to discontinue operation. Passenger trains were discontinued on August 5, 1914.

At a meeting of the local chairmen of the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen, held in Chicago last week, to consider the award of the board of arbitration in their recent controversy with the western railroads, a vote was taken in favor of joining with other organizations in the movement for an eight-hour day.

The Bangor & Aroostook, according to a notice from President Percy R. Todd, is to operate, as agent, the line of the Van Buren Bridge Company, and the jurisdiction of all officers of the B. & A. is extended over the property of the bridge company, as of May 1. The opening of the Van Buren bridge, between Maine and New Brunswick was noticed in the *Railway Age Gazette*, May 7.

The special committee on the Relations of Railway Operation to Legislation, has issued a bulletin showing that on January 1 last there were in service in the United States 12,900 all-steel and 5,700 steel underframe passenger cars, and 43,512 wooden cars. Of the passenger cars acquired by the roads in 1914, 74 per cent were all steel; and of 956 cars under construction January 1, only three were of wood. Seventy-five per cent were all-steel.

The attorney general announces at Washington that he will appeal to the Supreme Court of the United States in the cases of William Skinner and James S. Elton, directors of the New York, New Haven & Hartford, who, on appeal to the district court in New York, were held to be immune from the criminal prosecution which has been begun by the attorney general, because they had testified before the Interstate Commerce Commission in its inquiry relative to the doings of the road.

The headquarters and general offices of the Texas State Railroad have been moved from Rusk to Palestine, Tex. A roundhouse, a coal chute and car sheds are being built to take care of the business at this place. A consolidation is being effected whereby the different lines owned by the state of Texas will be under one management, with headquarters at Palestine. The construction of an extension of the road from Palestine through Corsicana to Dallas, is under consideration by the legislature and the state officers.

The "Travel Stamps" Corporation, noticed in the *Railway Age Gazette* of April 30, page 945, appears to have a nearby competitor before it is started, almost. Boston newspapers contain the advertisement of the New England Trade-Travel Company, 59 Temple Place, which offers "Free travel by train, trolley or steamship—Any place—Any time." The reader is exhorted to deal with the liberal and progressive merchants who give trade travel coupons; but the advertisement gives no names of any such merchants. The reader is asked to speak to his dealer about the plan and to write to the New England Trade Travel Company giving names of favorite department stores, grocers, etc.

Pennsylvania Full Crew Law Repeal

The bill before the Pennsylvania legislature repealing the "full crew" law of 1911 and giving specific authority to the Public Service Commission to regulate the number of men to be employed on trains was passed by the Senate on Monday evening last by a vote of 33 to 16, or about the same proportion between ayes and noes as prevailed in the House when the bill was passed a few weeks ago.

Governor Brumbaugh, during the campaign last autumn, wrote a letter in which he said that he was opposed to any change in the full crew law unless such change should be shown to be in favor of the working people; and this statement has led to much speculation as to whether the governor will sign the present bill. He is expected to give public hearings before taking action.

Not Often Met With?

[From a circular to agents, issued by R. T. Walker, Superintendent, Sunset-Central Lines, Houston, Tex.]

Recently one of our agents was called upon by a patron to see if arrangements could be made to have a ticket placed at a station on a foreign line to be used by a lady in coming to the station at which the request was made. It was then 9:30 p. m. and the ticket was to be used on a train leaving at 4 o'clock the next morning; but the agent immediately took the matter in hand and in a few minutes not only had the ticket placed but had the lady notified it was there for her.

The patron, making a handsome acknowledgment of the said accommodation, added:

"It is not often you meet with such agreeable, courteous gentlemen in charge of railroad offices. . . . I have thought several times since this incident occurred, how much of the unreasonable prejudice that exists in the mind of the public against the railroads would be removed if all employees were of the same type as this agent. . . ."

Moncton to Winnipeg

Reports from Ottawa say that the officers of the Canadian government railways, who have been instructed to establish train service on the National Transcontinental, from Quebec westward, are planning only to run, at least for the present, a train each way, twice a week. The purpose is simply to give the best practicable accommodation to the settlers along the line. The number of trains will be increased if there shall be sufficient demand.

Fifteen locomotives have already been taken across the river, at Quebec, for use on the new line. Between Moncton, N. B., and Levis, Que., 466 miles, where the government has been operating the road since last autumn, a train is run each way three times a week; Moncton to Edmundston Tuesday, Thursday and Saturday; Edmundston to Levis Monday, Wednesday and Friday, with return trips on alternate days.

On that portion of the new road from Winnipeg eastward to Graham, and thence southward to Fort William, where the Grand Trunk Pacific has been operating the line under a temporary lease, a similar arrangement has been in effect. A train runs from Winnipeg to Graham, 252 miles, on Monday, Wednesday and Friday; Graham to Fort William, 196 miles, Tuesday, Thursday and Saturday, the return trips being made on alternate days.

On some parts of the Grand Trunk Pacific economy in coal and wages is carried still farther than this. For example, from Young, Sask., to Hoey, 83 miles, there is a regular train for passengers only once a week; Young to Hoey on Monday, Hoey to Young on Tuesday.

Summary of Revenues and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for February, 1915, are as follows:

The net operating income of the railways of the United States for February increased $52 per mile, or 44.3 per cent, as compared with February, 1914; but February, 1914, was an abnormally poor month, net operating income per mile being 44.0 per cent less than in February, 1913. The increase shown this month, which only partially overcomes the considerable decrease in the same item a year ago, is the result of radical reductions in operating expenses.

Total operating revenues amounted to $205,112,212, a decrease from 1914 of $1,961,957. Operating expenses were $155,031,302, a decrease of $13,966,146. Net operating revenue amounted to $50,080,910, an increase of $12,004,189. Taxes amounted to $10,995,903, a decrease of $296,011. This left $39,028,155 for net operating income, available for rentals, interest on bonds, appropriations for improvements and new construction, and dividends. Operating revenues per mile of line averaged $897, a decrease of 1.9 per cent; operating expenses per mile averaged $678, a decrease of 9.1 per cent; net operating revenue per mile averaged $219, an increase of 30.3 per cent; while taxes per mile were $48, a decrease of 3.5 per cent. Net operating income per mile was $171, an increase of 44.3 per cent. Railways operating 228,678 miles of line are covered by this summary, or about 90 per cent of the steam railway mileage in the United States.

Total operating revenues of the eastern railways per mile of line increased less than one-tenth of 1 per cent as compared with February, 1914, operating expenses decreased 10.2 per cent, net operating revenue increased 81.8 per cent, taxes decreased 3.3 per cent, and operating income increased 158.9 per cent. Even this considerable increase over 1914 failed to bring operating income per mile up to the level of 1913, 1912, or 1911.

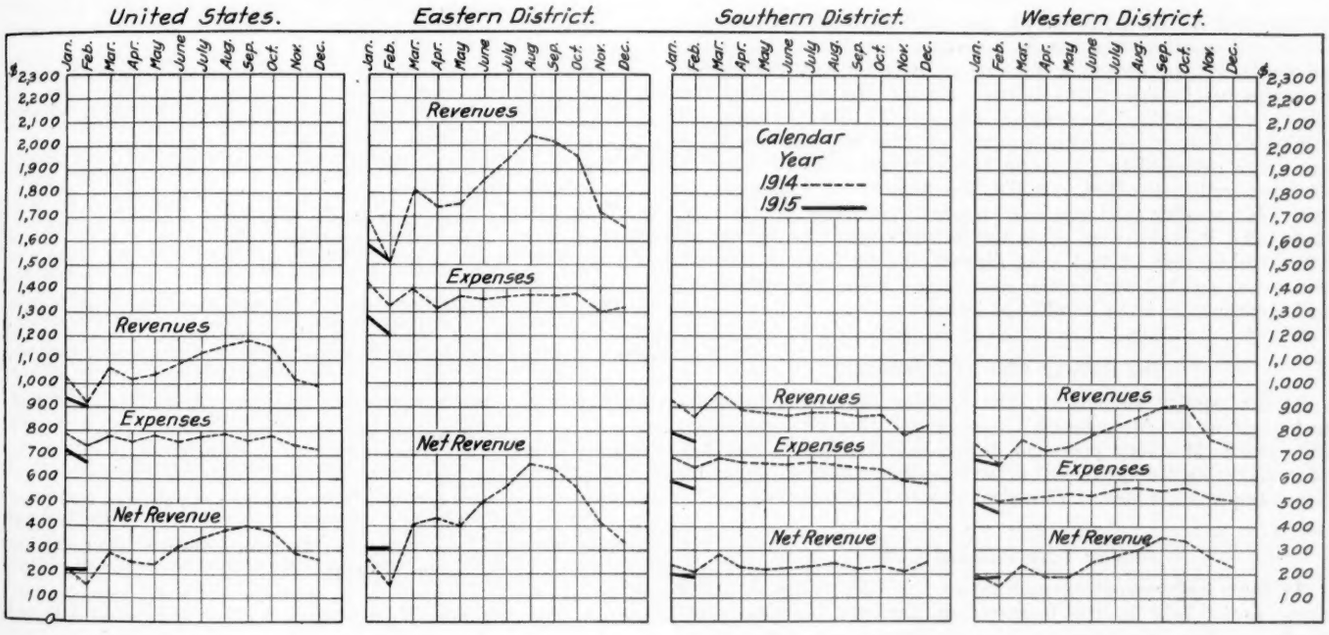
Total operating revenues of the southern railways per mile decreased 10.4 per cent, operating expenses decreased 11.6 per cent, net operating revenue decreased 6.7 per cent, taxes decreased 6.6 per cent, and operating income decreased 6.9 per cent.

Total operating revenues of the western railways per mile increased less than one-tenth of 1 per cent, operating expenses decreased 6.4 per cent, net operating revenue increased 21.0 per cent, taxes decreased 2.5 per cent, and operating income increased 28.8 per cent.

The eight months of the current fiscal year show a decrease in total operating revenues per mile of line of 7.9 per cent as compared with the corresponding period of the preceding year, a decrease in net operating expenses per mile of 9.7 per cent, and a decrease in net operating revenue per mile of 3.2 per cent.

This net operating revenue per mile increased 3.7 per cent in the east, decreased 17.8 per cent in the south, and decreased 3.7 per cent in the west.

February operating income per mile was 44.3 per cent greater in 1915 than in 1914, 19.6 per cent less than in 1913, 18.1 per cent less than in 1912, and 5.8 per cent less than in 1911.


United States.
Eastern District.
Southern District.
Western District.
Jan. Feb. Mar. Apr. May June July Aug. Sep. Oct. Nov. Dec.
$2,300 2,200 2,100 2,000 1,900 1,800 1,700 1,600 1,500 1,400 1,300 1,200 1,100 1,000 900 800 700 600 500 400 300 200 100 0
Revenues
Expenses
Net Revenue
Calendar Year
1914------
1915——

Monthly Revenues and Expenses Per Mile of Line in 1914 and 1915

May Meeting of the Railway Signal Association

The Railway Signal Association will hold its stated May meeting on Wednesday and Thursday, May 26 and 27, at the Hotel Astor, New York City. The board of direction will meet on the 25th. Committee III, on Power Interlocking, will submit revised specifications for electro-pneumatic interlocking, for fiber conduit and for incandescent electric lamps. Committee V, Manual Block, will submit rules for (1) care of dry battery; (2) maintenance of dry cells; (3) maintenance of gravity cells; (4) maintenance of caustic soda cells.

Committee VI, Standard Designs, will submit eight drawings—four revisions and four new ones. Committee X, Storage Battery and Charging Equipment, will submit as information specifications for nickel-iron alkaline storage battery. A report on the cost of electrical energy for a charging line will also be submitted, which will include the cost of types of apparatus for furnishing power, as follows: (1) Motor generator set. (2) Mercury-arc rectifier. (3) Gasolene engine generating set. (4) Gas engine generating set. (5) Steam engine generating set. The special committee on Lightning Protection will submit specifications for air-gap lightning arresters, vacuum-gap lightning arresters, and choke coils for use with lightning arresters. The special committee on Electrical Testing will submit a preliminary report on electrical instruments and various methods of testing.

After the adjournment of the meeting, May 26, the members of the Railway Signal Association will be the guests of the Signal Appliance Association, on a boat trip to West Point. Arrangements have been made to secure the steamer Grand Republic. After reviewing the dress parade, at the Military Academy, the party will have dinner on the boat; and there will be dancing in the evening.

Railway Storekeepers' Association

The twelfth annual convention of the Railway Storekeepers' Association will be held in the Hotel Sherman, Chicago, May 17 to 19. At the meeting committee reports will be presented on the following subjects:

Reclamation—D. C. Curtis (C. B. & Q.), chairman.

Recommended Practices—D. D. Cain (S. A. L.), chairman.

Accounting—P. J. Shaughnessy (Erie), chairman.

Piece Work—W. W. Eldridge (C. B. & Q.), chairman.

Standardization of Tinware—W. F. Jones (N. Y. C.), chairman.

Stationery—E. J. McVeigh (G. T. R.), chairman.

Uniform Grading and Inspection of Lumber—J. H. Waterman (C. B. & Q.), chairman.

Scrap and Scrap Classification—W. Davidson (I. C.), chairman.

Membership—W. D. Stokes (C. of G.), chairman.

Standard Buildings and Structures—L. G. Arnold (A. T. & S. F.), chairman.

Book of Standard Rules—J. G. Stuart (C. B. & Q.), chairman.

Marking of Couplers and Parts—A. J. Kroha (C. M. & St. P.), chairman.

Papers will also be presented on: Handling of Signal Material, and Accounting for Second Hand Serviceable Material.

National Association of Corporation Schools

The third annual convention of the National Association of Corporation Schools will be held at the Hotel Bancroft, Worcester, Mass., June 7 to 11 inclusive. The convention is held in Worcester this year as the result of an invitation tendered at last year's convention by three of Worcester's leading industrial concerns—the Norton Co., the Norton Grinding Co. and the American Steel & Wire Co.

The National Association of Corporation Schools was founded January 24, 1913, and its first meeting was held in New York University, New York. The functions of the association were designated as follows: to develop the efficiency of the individual employee; to increase efficiency in industry; and to influence courses of established educational institutions more favorably toward industry. The first annual convention of the association was held at Dayton, Ohio, September 16, 1913, and the second annual convention at the home of the Curtis Publishing Company, Philadelphia, Pa.

June Conventions Exhibits

Secretary J. D. Conway, of the Railway Supply Manufacturers' Association, has a most favorable report to make of the prospects for the coming exhibition at Atlantic City during the meetings of the American Railway Master Mechanics' and the Master Car Builders' Associations, June 9-17. To date over 200 exhibitors have made arrangements for exhibits, and the average space occupied by each one has increased over 16 per cent as compared with 1914. While the number of exhibitors is somewhat smaller than last year, applications are being received daily, and it looks now as if the exhibit would be almost as extensive as that of last year, despite the business depression which has existed during the past year. More new exhibitors will appear than for a number of years.

The Railway Club of Pittsburgh

At the regular meeting of The Railway Club of Pittsburgh, to be held at the Monogahela House, Pittsburgh, Pa., on Friday, May 28, E. M. Herr, president of the Westinghouse Electric & Manufacturing Company will present a paper entitled "Notes on Some Important Lines of Electrical Power Development."

New York Railroad Club

At the regular monthly meeting of the New York Railroad Club, to be held in the Engineering Societies building, New York, on May 21, a paper will be presented by Gustav Lindenthal, consulting engineer, entitled: Qualities of Good Steel Rails.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

American Association of Demurrage Officers.—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 21, 1915, Milwaukee, Wis.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 18-21, 1915, Richmond, Va.

American Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, July 13-16, 1915, Hotel Sherman, Chicago.

American Railway Association.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, New York.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

American Railway Tool Foremen's Association.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July 19-21, 1915, Hotel Sherman, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 22-26, 1915, Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Next spring meeting, June 22-25, 1915, Buffalo, N. Y. Annual meeting, December 7-10, 1915, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, May 19, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting with Master Car Builders' and Master Mechanics' Associations. Annual meeting, October, 1915.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conrad, 75 Church St., New York. Next meeting, June 22-23, Niagara Falls, N. Y.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday in month, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Hotel La Salle, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1126 W. Broadway, Winona, Minn. Next convention, July 13-16, 1915, Sherman House, Chicago.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 25 to 28, 1915, Chicago, Ill.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

Peoria Association of Railroad Officers.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

Railroad Men's Improvement Society.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Signal Association.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Stated meeting, May 26-27, 1915, Hotel Astor, New York. Annual meeting, September 14-17, 1915, Salt Lake City, Utah.

Railway Storekeepers' Association.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, July 15, 1915, Atlanta. Annual meeting, January, 1916.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of Newark.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Hotel Astor, New York.

Train Dispatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting, June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Utah Society of Engineers.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

Western Canada Railway Club.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday afternoon in month, except June, July and August, La Salle Hotel, Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meetings, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1915

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Atlantic City	170	$71,734	$56,596	$136,176	$32,383	$24,350	$2,941	$82,633	$98	$1,220	$143,579	—$7,403	$13,500	—$20,903	$9,901
Bessemer & Lake Erie	205	285,067	23,351	318,128	41,326	160,673	9,738	121,307	.....	11,935	333,362	—15,234	17,003	—32,239	96,332
Bingham & Garfield	27	108,752	2,882	112,090	4,979	14,390	1,049	19,919	58	1,621	42,016	70,074	2,457	67,617	—45,486
Birmingham Southern	44	38,391	571	55,078	8,231	10,621	673	16,855	.....	3,456	39,836	15,242	2,158	13,083	—6,831
Boston & Maine	2,302	2,293,827	1,095,457	3,760,715	542,856	547,166	33,231	1,756,472	15,312	114,479	3,009,515	751,199	158,455	592,744	204,594
Buffalo & Susquehanna Railway	91	11,463	4,902	18,516	3,561	5,715	412	11,149	7	2,334	23,179	—4,663	1,600	—6,263	—10,676
Buffalo, Rochester & Pittsburgh	586	618,737	78,708	722,325	80,605	172,023	11,545	260,918	1,110	18,662	544,863	177,462	20,000	157,386	—38,670
Canadian Pacific Lines in Maine	233	150,856	21,350	181,289	10,995	26,255	5,126	69,673	.....	3,305	115,354	65,935	12,000	53,935	31,604
Carolina, Clinchfield & Ohio	248	155,465	10,997	169,443	25,639	25,029	5,932	34,934	.....	10,485	101,312	68,131	14,250	53,877	—27,697
Carolina, Clinchfield & Ohio Ry. of S. C.	18	10,049	927	11,260	1,741	72	1,574	1,991	.....	929	6,307	4,953	750	4,197	—3,920
Central of New Jersey	678	1,719,573	381,757	2,218,566	179,501	476,563	24,698	830,208	11,581	55,039	1,577,560	641,006	119,836	521,168	21
Central Vermont	411	243,088	60,306	327,163	31,310	47,378	9,187	157,982	1,090	6,709	253,656	73,507	15,760	57,729	9,812
Charleston & Western Carolina	341	144,618	21,680	174,445	25,932	21,793	3,287	54,974	.....	3,953	109,875	64,571	5,000	59,571	6,483
Chicago & Erie	270	498,825	40,477	578,767	70,760	76,177	16,960	230,420	1,730	14,039	409,596	169,171	20,500	148,671	145,276
Chicago, Detroit & Can. Gd. Trunk Jctn	60	65,410	9,364	86,304	7,252	11,289	1,592	43,729	.....	1,426	65,288	21,016	2,870	18,146	22,678
Chicago, Indianapolis & Louisville	618	378,802	134,430	556,722	50,431	75,862	19,354	198,626	220	15,128	359,619	197,103	26,895	170,140	61,863
Chicago, Terre Haute & Southeastern	374	163,033	14,230	181,348	16,496	44,802	2,729	54,763	488	9,681	128,959	52,388	12,500	39,888	—33,581
Delaware & Hudson Co.—R. R. Dept	881	1,601,910	172,399	1,909,898	127,100	299,819	26,922	652,423	11,421	65,310	1,181,907	727,990	58,500	669,490	439,604
Denver & Rio Grande	2,575	1,189,761	277,597	1,579,046	115,786	316,746	36,742	476,470	23,724	73,088	1,042,556	536,490	81,600	454,802	28,164
Denver & Salt Lake	255	77,009	16,292	99,658	14,337	12,348	1,725	36,229	.....	5,024	69,663	29,995	7,500	22,495	25,377
Detroit & Toledo Shore Line	79	116,663	.....	117,172	9,577	10,355	1,428	34,545	.....	2,823	58,727	58,445	5,750	52,695	—21,379
Detroit, Toledo & Ironton	441	99,191	10,203	117,519	12,702	15,661	3,858	67,076	.....	5,702	104,999	12,520	5,500	7,020	54,111
Duluth, Winnipeg & Pacific	185	97,692	15,192	117,955	7,825	11,078	1,818	41,143	596	6,572	69,032	48,923	5,898	43,026	12,697
Erie	1,988	3,395,057	643,328	4,443,736	373,341	1,033,350	99,884	1,644,333	27,035	122,075	3,299,482	1,144,254	168,654	975,140	37,696
Galveston, Harrisburg & San Antonio	1,350	626,630	255,227	966,487	148,231	143,879	30,446	422,613	11,478	35,052	790,417	176,070	39,624	136,091	69,332
Georgia	307	169,514	51,355	240,418	16,873	46,524	11,471	97,524	424	7,321	180,138	60,281	3,100	56,823	—17,101
Grand Rapids & Indiana	575	292,947	120,253	442,486	52,956	85,856	10,172	190,403	60	13,824	353,272	89,214	21,555	67,659	7,726
Great Northern	8,077	3,298,068	935,046	4,747,969	520,359	602,122	94,939	1,496,184	58,069	98,012	2,866,212	1,881,757	326,869	1,554,612	166,026
Gulf, Colorado & Santa Fe	1,937	979,232	196,458	1,254,011	212,315	211,218	28,858	493,421	.....	31,008	976,565	277,446	49,162	228,094	104,721
Hocking Valley	351	321,702	58,044	403,869	39,596	74,494	8,923	153,151	.....	16,851	293,016	110,853	34,050	76,803	—59,777
Houston, East & West Texas	191	88,222	20,460	118,090	15,434	13,773	1,726	45,626	598	3,529	80,681	37,409	4,170	33,113	8,904
Houston & Texas Central	894	341,596	98,021	499,200	107,995	71,575	15,837	207,002	3,882	18,017	424,068	75,132	26,951	47,793	59,791
Kansas City, Mexico & Orient	740	161,921	24,433	196,973	44,696	42,962	8,601	96,013	.....	9,848	202,119	—5,146	9,180	—14,326	.....
Lehigh & Hudson River	97	134,366	9,183	144,617	13,850	20,971	1,431	51,236	.....	4,636	92,125	52,492	4,150	48,342	11,648
Louisiana Western	208	116,217	52,705	186,976	33,635	29,225	6,190	53,911	1,764	6,311	130,998	55,977	9,895	46,059	7,505
Minneapolis & St. Louis	1,646	694,449	154,164	891,515	92,352	129,964	18,006	372,841	94	21,259	634,515	257,000	31,411	225,589	109
Missouri, Oklahoma & Gulf Ry. of Texas	19	9,671	146	10,552	1,319	3,975	201	5,637	.....	467	11,598	—1,046	140	—1,186	—362
Mobile & Ohio	1,122	798,050	84,625	927,936	78,522	150,194	38,969	333,007	2,462	28,021	631,176	296,760	33,153	263,337	75,142
Morgan's La. & Tex. R. R. & S. S. Co.	405	233,980	80,022	354,929	42,810	43,302	10,132	145,475	2,169	11,623	255,354	99,575	20,013	79,367	43,687
Nevada Northern	165	100,435	6,069	109,470	17,069	13,081	784	22,643	53	3,991	57,622	51,849	5,003	46,845	—15,901
New York Central & Hudson River	5,979	8,718,427	3,265,392	13,911,473	1,379,107	3,082,278	238,968	4,843,531	197,147	348,990	10,090,022	3,821,451	850,829	2,969,937	.....
New York, Susquehanna & Western	140	199,693	39,452	278,277	28,754	26,787	4,377	121,240	.....	4,954	186,112	92,166	13,208	78,955	4,463
Northwestern Pacific	401	89,142	113,539	232,714	38,614	45,006	5,953	107,993	.....	6,381	202,861	29,853	16,068	13,762	—32,232
Oregon Short Line	2,162	1,018,405	331,397	1,480,808	186,702	229,097	33,149	385,557	22,072	52,412	908,795	572,013	114,926	456,686	—13,254
Oregon-Washington R. R. & Nav. Co.	2,027	756,979	319,687	1,183,899	131,441	171,808	39,409	393,204	10,524	57,537	802,087	381,812	99,738	281,982	—62,696
Panhandle & Santa Fe	670	258,322	55,044	331,635	74,516	69,154	3,889	105,924	.....	8,609	262,091	69,544	9,357	60,082	25,176
Pere Marquette	2,312	1,089,695	283,003	1,489,783	133,773	340,464	29,723	606,024	3,870	39,554	1,153,320	336,463	46,811	289,646	191,050
Philadelphia & Reading	1,120	3,312,248	472,694	3,972,177	307,744	737,176	43,851	1,416,537	10,653	76,465	2,590,771	1,381,406	99,836	1,281,329	220,448
Pittsburgh, Shawmut & Northern	294	129,628	9,623	141,421	13,991	30,839	1,499	49,213	.....	4,038	109,580	31,841	1,612	30,229	—10,762
Pittsburgh & Lake Erie	225	945,370	111,775	1,103,627	99,079	226,910	13,537	308,603	3,143	27,721	678,993	424,633	49,500	375,133	—224,355
Port Reading	21	122,619	.....	145,052	6,240	6,322	38	42,414	.....	167	55,181	89,870	12,000	77,870	9,459
Richmond, Fredericksburg & Potomac	88	139,151	93,588	267,603	27,515	32,580	2,612	89,795	5,062	7,092	164,657	102,946	6,476	96,467	12,048
St. Louis, San Francisco & Texas	235	47,504	18,503	72,812	20,984	17,981	2,154	46,206	.....	4,161	91,486	—18,673	1,039	—19,712	2,673
Southern	7,022	3,707,836	1,150,123	5,290,249	719,052	894,727	159,882	1,887,328	31,342	167,039	3,817,997	1,472,252	217,013	1,253,272	—65,525
Spokane, Portland & Seattle	556	201,030	98,360	327,607	99,256	38,805	8,070	81,725	3,199	13,688	244,742	82,864	53,400	29,403	—68,494
Tennessee Central	294	92,725	26,058	125,863	31,301	16,397	5,284	48,250	.....	6,599	107,831	18,032	4,466	13,561	—21,461
Terminal R. R. Ass'n of St. Louis	35	.....	194	229,827	20,156	16,149	957	77,937	.....	5,668	120,868	108,959	28,167	80,792	6,879
Texas & New Orleans	469	213,958	79,473	328,741	41,335	87,601	8,069	119,754	2,043	11,037	269,839	58,902	15,805	42,979	57,209
Texas & Pacific	1,887	1,041,122	288,870	1,451,465	178,505	238,998	34,692	682,062	12,192	37,638	1,182,929	268,536	68,700	199,614	—2,436
Toledo & Ohio Central	446	240,361	40,991	297,115	67,814	76,181	7,599	139,291	1,726	10,046	302,656	—5,541	21,000	—26,553	—131,724
Toledo, Peoria & Western	248	57,769	32,950	96,318	17,357	29,174	2,539	43,707	.....	3,884	96,661	—342	6,100	—6,445	2,870
Toledo, St. Louis & Western	451	356,268	22,038	404,507	43,653	55,727	15,984	161,256	.....	7,697	284,316	120,191	17,864	102,327	39,872
Trinity & Brazos Valley	315	49,787	9,116	64,442	21,412	17,208	2,418	36,328	.....	7,698	85,064	—20,622	4,585	—25,287	40,478
Union Pacific	3,617	2,370,394	790,681	3,595,229	383,076	643,120	113,056	1,049,773	67,388	121,527	2,376,281	1,218,948	192,672	1,025,720	—208,925
Vandalia	910	644,716	175,558	914,836	99,270	186,959	24,311	367,352	7,792	22,272	707,955	206,881	34,152	172,720	26,833
Virginia & Southwestern	240	123,494	11,023	137,818	36,069	36,090	1,973	41,844	.....	3,843	119,819	17,999	7,069	10,932	—25,127
Virginian	504	412,458	26,487	467,474	59,358	84,651	5,144	107,608	9,298	11,179	275,977	191,498	20,000	171,495	—6,344
Wabash	2,519	1,738,214	416,182	2,364,282	269,926	474,796	80,622	1,045,563	12,355	66,586	1,949,056	415,226	78,725	336,093	11,564
Western Pacific	943	267,096	121,004	415,850	70,620	59,459	22,232	136,703	10,558	19,412	318,983	96,867	25,067	71,780	71,878

Traffic News

The House of the Ohio legislature has passed a bill repealing the maximum freight rate law of that state.

The Chesapeake & Ohio and the Southern have reduced their rates on pig iron, for export, from furnaces in Virginia to Newport News, and Norfolk, Va., from $1.52½ to $1 per ton.

The public utilities committee of the House of the Illinois legislature has reported out, without recommendation, the bill to increase the legal maximum passenger fare in Illinois from 2 to 2½ cents a mile.

The Grand Trunk has announced that after May 16 it will cease to run suburban passenger trains between Chicago and Blue Island, Ill., 20 miles, and Harvey, 23 miles. It will run two suburban trains in each direction between Chicago and Valparaiso, Ind., 56 miles, instead of six in each direction as now.

The attorney general of West Virginia has secured an injunction in the Kanawha Circuit Court against the Baltimore & Ohio restraining it from collecting 2½ cents a mile for passenger fares, and the company has discontinued the sale of tickets at that rate, which was begun May 1, a conditional rebate check being given with each ticket.

The Grand Trunk Pacific announces the arrival at Winnipeg of a carload of wheat from the Peace River country in northern Alberta. This region is about 250 miles north of Edmonton and 500 miles north of the United States boundary. The wheat reached Edmonton over the Edmonton, Dunvegan & British Columbia, a new road extending north from Edmonton about 200 miles and then westward.

Car Surpluses and Shortages

The American Railway Association's Committee on Relations Between Railroads, Arthur Hale, chairman, has issued statistical statement No. 4, giving a summary of freight car surpluses and shortages for May 1, 1915, with comparisons.

The total surplus on May 1, 1915, was 290,819, on April 1, 1915, 327,441, and on May 1, 1914, 230,533.

The surplus for April 1, 1915, shown above, includes figures reported since the issue of statistical statement No. 3 (published in the *Railway Age Gazette* of April 16, p. 865.)

The decreases in surplus under April 1, 1915, are chiefly in Groups 2, 3 and 4 (East and Central East), except box cars. There is an increase in the surplus of box cars chiefly in Group 9 (Central South) and Group 11 (Canada).

The total shortage on May 1, 1915, was 1,192; on April 1, 1915, 357, and on May 1, 1914, 1,654.

The figures by classes of cars follow:

Classes	Surplus	Shortage
Box	100,751	288
Flat	16,669	134
Coal and gondola	119,545	130
Other	53,854	640
Total	290,819	1,192

The Cummins Amendment

Western railroads have filed with the Interstate Commerce Commission a supplement to the Western Classification to make it conform to the Cummins amendment. The supplement includes a note which says: "Ratings on livestock vary according to the valuation stated by shippers, and if carriers have no means of determining values of livestock when tendered for transportation shippers will be required to declare in writing the valuation at time and place of shipment. Where shippers refuse to declare value and to execute the livestock contract, animals will not be accepted for transportation." This is followed by maximum valuations on the various classes of livestock, with a provision that where the valuation declared by shippers exceeds the values mentioned, an addition of 3 per cent will be made to the rate for each 50 per cent or fraction thereof, of additional declared value.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission has issued a conference ruling that on and after August 1, the commission will not consider on the informal docket any application for authority to waive collection of undercharges on shipments delivered subsequent to July 31. A circular has been issued in which the commission says that in cases where tariffs have erroneously been fixed at too high a figure or have been grossly and palpably unreasonable and the full tariff charges have not been collected, it has been the practice of the commission on the informal docket to authorize the carriers concerned to waive the collection of undercharges. It appears, however, that the concession thus granted has been "much abused and overworked both by carriers and shippers." Numerous instances have come to the attention of the commission in which shippers frequently refused to pay charges when they believed them to be unreasonable and the carriers acquiesced in that course of action, hoping the commission would later authorize them to waive collection. Also, the commission says, just prior to proposed reductions in rates shipments have been solicited and made upon the understanding that the full tariff charges will not be collected, and that the carrier will apply to the commission for authority to waive collection. Such practices, the commission says, are unlawful and work serious discrimination.

Initial Carrier Liable for Increase Charges Resulting from Re-routing Without Instructions

Fred S. Morse Lumber Company v. Louisville & Nashville et al. Opinion by the commission:

A carload of yellow-pine lumber originating at Sanford, Ala., on the Louisville & Nashville was consigned to Middletown, N. Y., routed via the Erie Railroad. On account of floods the initial carrier, without instructions from the owner, forwarded the shipment over another route at a higher rate. The commission finds that the initial carrier had no legal right to divert the shipment involved from the route specified in the bill of lading, and that, therefore, it is liable for the resulting increase in charges. Reparation awarded. (33 I. C. C., 571.)

Commutation Tickets

Wellesley W. Gage v. Erie. Opinion by the commission:

Complainant purchased from defendant a fifty-trip family ticket good between Ridgewood, N. J., and New York. The tariff authority for the ticket contained the following provision:

> This class of ticket under conditions of its contract is valid for passage for one year from date of passage, except where otherwise noted, and good only for transportation of the person whose name appears thereon and members of his immediate family and servants therein. The expression "immediate family" applies to those not only living with, but entirely dependent upon, the person whose name appears on face of ticket.

The commission finds that the carrier acted correctly when it refused to honor the ticket when presented by the son-in-law who lived with, but was not dependent upon, complainant. Complaint dismissed. (33 I. C. C., 593.)

Oregon-Washington's Ownership of Boats on Willamette and Columbia Rivers

Opinion by Commissioner Clark:

Upon application of the Oregon-Washington the provisions of section 5 of the act to regulate commerce, as amended by section 11 of the Panama Canal act, for an extension of time beyond July 1, 1914, during which petitioner may continue to operate boats on the Willamette and Columbia rivers, Lake Coeur d'Alene, and the Snake river; the commission holds that the Oregon-Washington does or may compete with its boats in their operations on the Willamette and Columbia rivers, Lake Coeur d'Alene, and the Snake river within the meaning of the act, but that the operation of these boats is in the interest of the public and of advantage to the convenience and commerce of the people; that their continued operation by petitioner will neither exclude, prevent, nor reduce competition on the routes by water, and that

the application should be granted. The rates, fares, schedules and regulations of these boats governing traffic subject to the act, moved by them, must henceforth be filed with the commission. (33 I. C. C., 658.)

Ownership of Steamboat Line Between Carrabelle and Apalachicola, Fla.

Opinion by Commissioner Meyer:

The Georgia, Florida & Alabama asks that it be allowed to continue to own and operate a steamboat between Carrabelle and Apalachicola, Fla. The commission finds that so long as their respective operations remain as at present, the boat line is but an extension of the rail line and the rail line does not, or may not, compete for traffic with the boat line within the meaning of the act. Petitioner's continued ownership and operation of the rail line and boat line is not, and will not be, in violation of section 5 of the act to regulate commerce, as amended by the Panama Canal act. (33 I. C. C., 630.)

STATE COMMISSIONS

A meeting of representatives of the National Association of Railway Commissioners was held at Chicago on Wednesday to consider what part the state commissioners shall take at the valuation conference before the Interstate Commerce Commission, Division of Valuation, at Washington on May 27.

The railroad commission of Louisiana has issued an order prohibiting the railroads of that state from requiring notice of claims for damage to freight to be filed within four months; the commission declares that the carriers must obey the law of the state allowing two years from the date of shipment in which to file such claims.

COURT NEWS

The Supreme Court of the United States, in an opinion handed down last Monday, decides against the Interstate Commerce Commission in its suit to compel F. W. Ellis, general manager of the Armour Car Line, to answer questions and produce papers relative to alleged unreasonable allowances paid by railroads for the use of Armour's cars.

The Chicago, Rock Island & Pacific, the St. Louis, Iron Mountain & Southern and the St. Louis Southwestern have filed a petition in the United States district court at Little Rock, Ark., asking an order to restrain the Arkansas Railroad Commission from enforcing the state two-cent passenger fare law. The court recently issued an injunction restraining the enforcement of the law as to the St. Louis & San Francisco. The petition will be argued on May 28.

Presentation of Freight Claim—Burden of Proof

In an action for injury to livestock the bill of lading stipulated that claim must be presented within 30 days. The Washington Supreme Court holds that the burden of proof of presentation of the claim rests on the plaintiff. The presentation of claim was an affirmative fact peculiarly within the knowledge of the plaintiff, especially when applied to a shipment accompanied by an agent of the shipper. Moreover, it would ordinarily be an easier matter for the shipper to prove that such a claim had been presented than for the railroad to prove the negative thereof. Henry v. Chicago, M. & P. S. (Wash.) 147 Pac. 425.

Private Siding—Obligation to Furnish Cars

A railroad company contracted with a lumber company for the construction and maintenance of a spur track for the exclusive benefit of the lumber company. Subsequently the lumber company bought the timber on a tract of land to be delivered on board cars on the spur track. In an action by the seller of the timber against the railroad company for refusal to furnish cars at the spur, the Texas Court of Civil Appeals holds that the company was under no contract obligation to the plaintiff to furnish cars or to receive freight from him. The contract between the road and the lumber company was not made for the plaintiff's benefit, and he was an entire stranger thereto. And, under the rule that railroads are only required by law to furnish cars at stations provided for the service of the public, or where the railroads are in the habit of accepting freight from any person offering it for transportation, the defendant was under no obligation to plaintiff at the spur. It was a private track, and, even if the road owed the plaintiff the duty to furnish cars, it had no notice of the contract between him and the lumber company and no knowledge of the facts which would make the damages claimed the probable result of its failure to furnish cars. Beaumont, S. L. & W. v. Moore (Tex.) 174 S. W., 844.

Liability of Initial Carrier—Surrender of Bill of Lading

Goods were shipped under a bill of lading requiring surrender of the original before delivery to the consignee. The shipment was delivered by the terminal carrier upon the consignee's written order without surrender of the bill. Following the ruling of the Supreme Court of the United States in Atlantic Coast Line v. Riverside Mills, 219 U. S. 186, the Michigan Supreme Court holds, in an action by the shipper against the initial carrier, that section 7 of the interstate commerce act covers such a claim, and that the initial carrier is liable. Thomas v. Blair, receiver of Pere Marquette (Mich.), 151 N. W., 1,041.

Diversion of Water—Unexpected Injury

In a building adjacent to the railroad right of way, there were stored 50 odd barrels of lime. The ditch and culvert along the right of way were sufficient to carry away surface waters ordinarily collected in the ditch, but an exceptionally heavy rainfall caused the water to be set back, and to reach the lime, causing a fire which destroyed the buildings. In an action against the company, it was held by the New York Appellate Division that it was not guilty of actionable negligence in maintaining the ditch and culvert, and was not liable for the fire. The injury was not of such a nature as a reasonably prudent man would anticipate. Snook v. New York Central, 152 N. Y. Supp., 564.

Crossing Accident—Contributory Negligence

A boy of 12 years was riding on a baker's wagon, which was driven over a crossing with such gross carelessness on the part of the driver that a collision occurred, resulting in the boy's death. In an action therefor it was held by the Maine Supreme Court that no recovery could be had, not on the ground of imputed negligence of the driver, a doctrine which does not obtain in Maine, but because of the boy's own want of due care. He was a bright and intelligent boy, familiar with the crossing and its approaches, and knew it to be a place of danger, and yet he approached the crossing without taking the slightest precaution, either by looking or listening. Crosby v. Maine Cent. (Me.) 93 Atl., 744.

Power to Condemn Waters

The Pennsylvania Supreme Court holds that a railroad company, chartered under the general railroad laws of the state, cannot, in the exercise of its right of eminent domain, condemn for the use of its engines or other corporate purpose the water of a stream over which it has built its roadbed on a right of way acquired by condemnation, its statutory authority being limited to the appropriation of land and material for the location and construction of the roadway. Connellsville & S. L. v. Marketon Hotel Company (Pa.), 93 Atl., 635.

Duty Toward Trespassers on Tracks

The Kentucky Court of Appeals holds that proof that an engineer looked ahead when several hundred feet from a trespasser will warrant a judgment against the railroad for the man's death on the theory that he was seen and the engineer failed to use reasonable care to avoid injury. If the enginer did see the traveler at this point, he might, in the exercise of ordinary care, have concluded that in proper time the man would have left the track, especially as the conditions were such that he could do so quickly and safely. Willis v. L. & N. (Ky.), 175 S. W., 18.

Liability of Initial Carrier—Non Delivery

A consignor, upon learning that his interstate shipment had not been accepted by the consignee and had not been delivered, directed the initial carrier to have the goods returned at once, and then himself took up the matter with the final carrier, making no further application to the initial carrier. The New York Supreme Court, Appellate Division, holds that the initial carrier

was not liable for damages for the final carrier's failure to return the goods to the consignor; any "injury or damage" in such case not being within section 20 of the Interstate Commerce Act, imposing liability on the initial carrier for damage or injury by connecting carrier, nor within section 1 of that act, defining "transportation," as used in section 20, to include services in connection with the receipt, delivery and transfer in transit. Wien v. N. Y. Cent. (N. Y.), 152 N. Y. Supp., 154..

Conductor Not Subject to Telephone-Operator's Hours

The United States Circuit Court of Appeals, Fifth circuit, in the case of the government against the Florida East Coast Railway, appealed from the District Court for the Southern District of Florida, holds that a conductor who is required to stop at stations and by the use of the telephone to report, transmit, receive, or deliver train orders pertaining to his train is not embraced within the terms of the proviso limiting the hours of service of operators to 9 or 13 hours; and, therefore, may be required to remain on duty for 16 hours in a 24-hour period. The decision was by District Judge Maxey, with whom sat Pardee and Walker, circuit judges. Judge Walker dissented.

Conductor E. M. Little, on January 10, 1914, at and between the offices of New Smyrna and Fort Pierce was on duty from 7 a. m. to 11 p. m., and used a telephone in defendant's office at Quay and Lyrata and transmitted or received orders.

After quoting the law Judge Maxey says: The purpose of the proviso was to prescribe shorter hours for work for operators whose primary and principal duities require them to operate telegraphic instruments and telephones, etc. . . . Such employees must perform their duties at a fixed place. It is evident that the intention of the law is that such employees must have a fixed place for work, and at such place they should not be required or permitted to work a longer time than the number of hours prescribed. If the proviso be construed to include a conductor, what number of hours, it may be asked, shall he be permitted to work during the 24-hour period? Shall it be 16, 13, or 9 hours? Having regard for the language of the proviso, it will be scarcely possible to give a satisfactory reply to the question—a difficulty which affords additional ground for holding that as to such employee the proviso is altogether inapplicable.

It seems to us that it would plainly violate accepted canons for construing statutes to include in the proviso a train conductor, having no fixed place for work except on a moving train, and who, under section 2, may be required or permitted to work 16 hours. His primary and chief duty requires him to look after his train, and stopping at a station to transmit or receive an order affecting his immediate train is a mere incidental service which can not operate to classify him as a telegraph or telephone operator or train despatcher. The contention of counsel for the government is that train conductors are included in the words of the proviso, "or other employee," who by the use of the telegraph or telephone despatches, reports, etc. We have endeavored to show that it was not the intention of the lawmakers to so include them. But for another reason the construction insisted upon by the government is thought to be erroneous. The words "or other employee" evidently refer to employees charged with duties similar to those performed by telegraph operators and train despatchers, in accordance with the following recognized rule for the construction of statutes: "In the enumeration of particulars, general and comprehensive terms are sometimes used in the construction of which reason and good sense require that if you would not violate the intention of the writer their meaning must be restricted to things of a like nature and description with the particulars among which they are found." (3 Words & Phrases, 2328.)

This proviso of section 2 of the "hours-of-service act" was construed by the Circuit Court of Appeals for the Eighth circuit in Missouri Pacific v. United States, 211 Fed., pages 893-897. At page 897 it was said by the court:

> As the word "employee" in the proviso of section 2 includes "operator" and "train despatcher," the conclusion here is irresistible that Congress intended by the use of the words "other employees" to mean an employee engaged primarily in the same class of service as would be performed by an operator or train despatcher.

In our construction of the statute we have steadily kept in view the beneficent purpose of the law. If we have construed it properly, the Congress may enact such further legislation as may be deemed best for the public interests.

Railway Officers

Executive, Financial, Legal and Accounting

W. G. Davidson has been appointed treasurer of the Pacific & Eastern with office at Portland, Ore., succeeding William Gerig, resigned.

F. S. Forest has been appointed secretary of the central committee of safety of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Oregon.

M. F. Harden has been appointed cost accountant of the Central of Georgia, with office at Savannah, Ga. It will be his duty, in co-operation with other departments, to prepare, study and interpret statistics of cost and performance.

George H. Smith, whose appointment as general attorney of the Oregon Short Line and general attorney for Utah for the Union Pacific, with headquarters at Salt Lake City, has already been announced, was born in 1874, and was educated in the public schools of Utah. He was graduated from the law department of the University of Michigan in June, 1899. He entered railway service on July 1, 1899, as law clerk in the law department of the Oregon Short Line, and was appointed assistant attorney on January 1, 1900. In 1905 he was appointed assistant attorney for Utah for the Union Pacific and the Southern Pacific. From the spring of 1905 until March 15, 1915, he was also assistant general atorney for the Utah Light & Railway Company.

G. H. Smith

E. E. Calvin, vice-president and general manager of the Oregon Short Line, has been elected also first vice-president of the San Pedro, Los Angeles & Salt Lake, with headquarters at Salt Lake City, Utah, succeeding W. H. Bancroft, deceased.

Operating

George Johnson has been appointed superintendent of the Pacific & Eastern, with headquarters at Midford, Ore.

George W. Jett has been appointed superintendent of telegraph of the Norfolk & Western, with office at Roanoke, Va., vice W. C. Walstrum, deceased.

Paul McKay has been appointed assistant superintendent of the Portland division of the Spokane, Portland & Seattle, with headquarters at Portland, Ore.

C. A. Hawkins has been appointed superintendent in charge of traffic and operation of the Nezperce & Idaho and the Lewiston, Nezperce & Eastern, with headquarters at Lewiston, Idaho, succeeding W. A. Pease, resigned to engage in other business.

Traffic

M. E. Ward has been appointed commercial agent of the Ft. Smith & Western, with headquarters at Ft. Smith, Ark.

John G. Elgin, city passenger agent of the Baltimore & Ohio, at Louisville, Ky., has been appointed district passenger agent, with headquarters at Louisville, succeeding R. S. Brown, deceased.

James T. Neison has been appointed general agent of the Missouri Pacific-Iron Mountain System, with headquarters at Philadelphia, Pa., succeeding A. S. Edmunds, resigned to engage

in other business. The position of commercial agent at Pittsburgh, Pa., has been abolished.

G. M. Bowman, traveling agent of the Chicago, Milwaukee & St. Paul, has been appointed commercial agent at Cincinnati, Ohio, succeeding E. H. Spence, who has been transferred to Pittsburgh, Pa.

C. C. P. Rausch, who has been appointed general freight agent of the Missouri Pacific-Iron Mountain System, with headquarters at St. Louis, was born September 24, 1872, at St. Louis, Mo., and was educated in the public schools. He entered railway service July 1, 1888, as office boy for the Missouri Pacific, and was subsequently rate clerk, tariff clerk, chief tariff clerk and chief clerk of the general freight office. On March 1, 1907, he was appointed assistant general freight agent of the road from which position he is now promoted.

W. I. Jones, whose appointment as general freight agent of the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis, has already been announced, began railway work in 1886 as a locomotive fireman on the Iron Mountain. He was employed in that capacity until October, 1888, when he was transferred to the local office of the Missouri Pacific and after remaining there about 15 months went to the traffic department. He left railway work in May, 1891, returning in March, 1901, as chief clerk to the assistant general freight agent of the Missouri Pacific. In November, 1906, he was promoted to commercial agent at Monroe, La., returning to the general office as chief clerk to the freight traffic manager on November 1, 1907. Mr. Jones was made assistant general freight agent in December, 1910, and on August 1, 1913, he was appointed assistant to the general traffic manager of the same road. In March, 1914, he was appointed assistant to the vice-president.

W. I. Jones

W. H. Tayloe, whose appointment as passenger traffic manager of the Southern Railway with headquarters at Washington, D. C., has already been announced in these columns, began railway work in May, 1886, as a clerk in the ticket auditor's office of the Chesapeake & Ohio, at Richmond, Va. From October, 1886, to July, 1889, he served on various roads in the South as stenographer, and in August, 1889, was appointed stenographer and rate clerk to the general passenger agent of the Richmond & Danville, at Birmingham, Ala. From May, 1890, to August of the following year he was traveling passenger agent, and then to October, 1891, was chief clerk to assistant general passenger agent of the same road. He was then consecutively traveling passenger agent at New York, chief clerk to assistant general passenger agent at Savannah, Ga., and at Washington, D. C., of the same road, and later for about four years was district passenger agent of the same road and its successor, the Southern, at Atlanta, Ga. In August, 1896, he was appointed district passenger agent of the Southern Railway at Norfolk, Va., and from February, 1897, to December, 1900, was assistant general passenger agent at Louisville, Ky., when he was transferred in the same capacity to Atlanta, Ga. In May, 1904, he was promoted to general passenger agent of the same road at Washington, D. C. Then, from August, 1909, to December 31, 1912, he was general agent of the freight and passenger departments of the Southern Railway at Denver, Colo. On January 1, 1913, he was appointed traffic manager of the Chesapeake Steamship Company, with office at Baltimore, Md., which position he held at the time of his recent appointment as passenger traffic manager of the Southern Railway, as above noted.

Engineering and Rolling Stock

Frank A. Merrill, acting engineer maintenance of way of the Boston & Maine at Boston, Mass., has been appointed engineer maintenance of way.

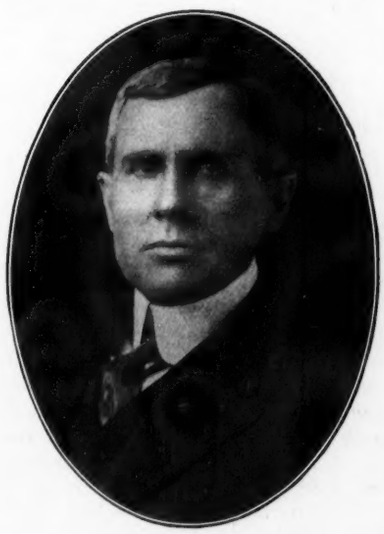
William Brandt has been appointed general foreman of the shops of the New York, Chicago & St. Louis, at Conneaut, Ohio, succeeding T. C. Baldwin, promoted.

W. C. Sealy has been appointed master mechanic of the Ontario lines of the Grand Trunk, with headquarters at Toronto, Ont., in place of J. Markey, deceased.

E. A. Hadley, whose appointment as chief engineer of the Missouri Pacific-Iron Mountain System, with headquarters at St. Louis, Mo., has already been announced in these columns, was born in Lowell, Mass., in 1879, and was educated in the common and high schools, graduating from the Lowell high school in 1897. From 1897 to 1901, he was apprenticed to Smith & Brooks, civil engineers, Lowell, Mass., and there secured a combined course of engineering study and practice. In 1901 he entered the employ of the Boston & Maine, and was subsequently draftsman, assistant engineer and resident engineer until 1910. On June 1, 1910, he was appointed to the position of engineer of design of the Missouri Pacific. During the past 18 months he has been engaged on special engineering investigations for the president's office under the title of assistant engineer.

E. A. Hadley

O. E. Selby, whose appointment as principal assistant engineer of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati, Ohio, has already been announced, was born on March 9, 1869. He was educated in the common and high schools and the State University of Iowa. He entered railway service in 1887 as leveler and draftsman for the Chicago, Burlington & Northern. He was subsequently connected with the Illinois Valley & Northern and the Houston Central Arkansas & Northern until 1890, when he became resident engineer on the construction of the Louisville & Jeffersonville bridge over the Ohio river at Louisville, Ky. He remained in that position until 1899, when he was appointed assistant engineer of the Cleveland, Cincinnati, Chicago & St. Louis. In 1905 he was appointed bridge engineer and later engineer of bridges and structures, from which position he is now promoted.



O. E. Selby

C. L. P. Russel, assistant supervisor of the Pennsylvania Railroad at Middletown, Pa., has been appointed supervisor of Division No. 31, with office at Cresson, vice W. B. Groff, Jr., transferred, and S. H. Kuhn, supervisor at Olean, N. Y., has been ap-

pointed supervisor of Division No. 28, with office at Norristown, vice E. J. Ayars, transferred.

G. E. Ellis, signal engineer of the Kansas City Terminal, has been appointed service signal engineer for the Interstate Commerce Commission, with headquarters at Washington, D. C.

Tom Windle, formerly master mechanic of the International & Great Northern at Palestine, Tex., has been appointed master mechanic of the Denver & Salt Lake, with headquarters at Tabernash, Colo.

Henry Bartlett, mechanical superintendent of the Boston & Maine at Boston, Mass., has been appointed chief mechanical engineer, reporting to the president. He will have general supervision over matters connected with motive power and other equipment in so far as may be necessary to preserve the standards and systems of the railroad and to secure adherence thereto. All plans and specifications for locomotives and other equipment will be prepared by him and approved by the general manager. The construction of new equipment will be supervised by him and he will perform such other duties in connection with motive power and equipment as may be assigned to him by the president. Charles H. Wiggin, superintendent of motive power at Boston, will report to the general manager. He will have charge of all locomotives and car shops, engine houses and appurtenances, and of the maintenance, repair, and inspection of locomotives and other equipment. The master mechanics, superintendents of shops, electrical superintendent, general car inspector, general air brake inspector and the general piece work inspector will report to him.

OBITUARY

W. C. Walstrum, superintendent of telegraph of the Norfolk & Western at Roanoke, Va., died on May 8, at the age of 60.

P. P. Mirtz, assistant engineer, mechanical department, of the New York Central, died suddenly on May 11, at his home in New York.

O. S. Cockey, general agent of the freight department of the Grand Trunk at New York, died on May 9, at White Sulphur Springs, W. Va.

Charles H. Bronson, formerly from April, 1890, to 1904, auditor of the Pittsburgh & Lake Erie, died on May 3, at Cleveland, Ohio, at the age of 70.

William Pond Harris, formerly until 1898, superintendent of the Plant System, now a part of the Atlantic Coast Line, died on April 24, at his home in Johnson City, Tenn., at the age of 69. He began railway work in the operating department, and served consecutively on the Delaware, Lackawanna & Western; then as superintendent of the Chesapeake & Ohio; the Louisville & Nashville; Baltimore & Ohio; Atchison Topeka & Santa Fe; Charleston, Cincinnati & Chicago, now a part of the Carolina, Clinchfield & Ohio and the Plant System, until 1898, and since that time he had been out of railway work.

Fuel Supplies on the Swedish Railways.—The Swedish state railways are reported to have recently contracted for 200,000 tons of German coal briquettes and 72,000 tons of German coke. A mixture of the two is to be used as a locomotive fuel on some lines. The price is considerably less than that of English coal.

Efforts Made by English Railways to Release Men for the Colors.—Further action by the railway companies, in order to release men for the army or to allow them to be employed on munitions, is likely to be shortly put into force. No men of military age and physique are now taken on, and where their services can be utilized without disadvantage, women are drafted into the service instead. With a view to reducing clerical labor and thereby release clerks eligible for military service, it is proposed to have all parcels and freight sent prepaid, and so reduce bookkeeping work. The practice in force on many railways of prepaying parcels charges by stamps will possibly be universally adopted. Parcels and freight will probably be collected and delivered by the same cartage service, and thereby save men, horses and drays, and a further economy in this direction is possible by further curtailing the hours when goods are received.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Fort Worth & Denver City has ordered 10 superheater oil-burning, Mikado type locomotives from the Baldwin Locomotive Works.

The Boston & Albany has given the American Locomotive Company an order to convert 10 Consolidation type locomotives to Mikado type.

The Serbian Government is reported to have ordered about $50,000 worth of small locomotive parts from the American Locomotive Company.

The Western Maryland reported in the *Railway Age Gazette* of May 7 as being in the market for 10 locomotives, has issued inquiries for 15 Mallet type locomotives.

The French Government, which was reported in the *Railway Age Gazette* of last week as having issued specifications for 100 large locomotives, is also in the market for 25 or 50 locomotives for the Paris-Orleans line.

The Cuba Railroad, reported in the *Railway Age Gazette* of last week as having ordered 10 ten-wheel type locomotives from the American Locomotive Company, has ordered 15 locomotives from that company. As this order is in addition to another recent order for 15 locomotives, this makes a total of 30 locomotives.

CAR BUILDING

The Virginian has ordered 500 steel underframes from the Greenville Steel Car Company.

The Chicago, Rock Island & Pacific has issued inquiries for 5,000 40-ft., 40-ton all-steel box cars.

The Norfolk & Western is inquiring for 10 70-ft. coaches, 12 70-ft. combination baggage and express cars and 2 70-ft. postal cars.

The Chicago & North Western has ordered 2,000 steel underframe box cars from the Western Steel Car & Foundry Company.

The Bingham & Garfield is in the market for 50 60-ton Clark extension side dump ore cars for use by the Utah Copper Company.

The Toronto, Hamilton & Buffalo has ordered 10 steel underframe and steel frame stock cars from the National Steel Car Company.

The Chicago Elevated Railways have ordered 122 all-steel motor cars from the Cincinnati Car Company. These cars will be equipped with Baldwin trucks.

The Chicago, Milwaukee & St. Paul is reported to be contemplating asking prices on 2,000 cars in addition to the 2,000 it plans to build in its own shops. This item has not been confirmed.

The Fort Worth & Denver City has ordered 1,200 40-ft., 40-ton steel center sill box cars, 300 40-ft., 40-ton steel center sill stock cars, and 200 100,000-lb. capacity, steel gondola coal cars from the Haskell & Barker Car Company.

The Department of Commerce has ordered one all-steel fish-distributing railway car from the Harlan & Hollingsworth Corporation, for use in connection with the work of the Bureau of Fisheries. The car will be fully equipped for movement on fast passenger trains.

The Interborough Rapid Transit has issued inquiries for 974 trucks. The order which this company recently placed with the Pullman Company for 478 subway car bodies has been approved by the New York Public Service Commission, First district.

THE RUSSIAN GOVERNMENT has ordered 2,000 steel underframe box cars from the Eastern Car Company, New Glasgow, N. S., and 2,000 from the Canadian Car & Foundry Company. It has also ordered 20,000 steel axles from the Cambria Steel Company, and is reported to have placed 8,000 cars with the Pullman Company and 2,000 cars with the Seattle Car & Foundry Company. The negotiations for a large order for cars with the Pressed Steel Car Company, are reported as not yet completed.

IRON AND STEEL

THE HAVANA CENTRAL has ordered 1,000 tons of rails from the Maryland Steel Company.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 10,000 tons of rails from the Illinois Steel Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 2,700 tons of steel for oil tanks from the Kennicott Company, Chicago.

THE CHICAGO, BURLINGTON & QUINCY has ordered 1,353 tons of steel for various bridges from the Fort Pitt Bridge Company.

THE CHICAGO, MILWAUKEE & ST. PAUL is in the market for 32,000 tons of steel to cover construction of freight cars at its Milwaukee shops.

THE RUSSIAN GOVERNMENT has issued inquiries for 6,000 to 8,000 tons of railroad spikes to be made to Canadian Pacific standards. It is supposed that these will be used in connection with the double tracking of the Trans-Siberian now under way.

MACHINERY AND TOOLS

THE PENNSYLVANIA RAILROAD is in the market for a 25-ton gantry crane.

THE PRESSED STEEL CAR COMPANY is inquiring for a number of machine tools.

THE BALTIMORE & OHIO is in the market for a 60-ft. electric gantry crane, for Georgetown, D. C.

THE DELAWARE, LACKAWANNA & WESTERN has ordered a vertical milling machine and a 36-in. swinging lathe.

THE LEHIGH & NEW ENGLAND is in the market for a 35-ton double-trolley and a 10-ton single-trolley electric traveling crane and for a number of machine tools for the new shops at Pen Argyle.

RUSSO-BULGARIAN RAILWAY.—It is reported that two Russian delegates have arrived in Sofia with the object of concluding an agreement with the Bulgarian Railway Administration, with a view to establishing direct railway communication between Salonika and Russia.

WAGES OF EMPLOYEES OF THE LONDON TUBES.—It is specially to the credit of the London underground electric railway companies that they have agreed to grant to their employees the same advances of wages as have been conceded to meet war conditions of living expenses by the railway companies of the country generally. It must be borne in mind that the tube railway companies, while suffering from disadvantages arising from the state of war, do not share in the advantages arising from the government guarantee to make up net revenue to that accruing before the war began. As the tube railways have no physical junctions with any of the main lines of the country, they are not represented on the Railway Clearing House, and so they did not come within the scope of the government guarantee. They have no goods traffic, their capitalization is necessarily high, and the dividends on ordinary stock—where they exist at all—are low. Yet they have generously come into line with British railways generally, and the war bonus, to be retrospective from the middle of February, is to be paid to many men besides those embraced in the conciliation scheme. While there is a prospect that part at least of the war bonus wages will be repaid by the government to British railway companies generally, it appears doubtful whether this will be the case in regard to the tube companies. Gratitude is rather a scarce sentiment as from employed to employer, but there surely ought to be some feeling of that sort on the part of the underground railwaymen.—*Railway Gazette.*

Supply Trade News

Charles W. Sherburne, founder of Sherburne & Company, Boston, Mass., died on May 6.

The Van Dorn Iron Works, Cleveland, Ohio, has increased its capital stock from $150,000 to $350,000.

D. J. Normoyle has been appointed manager of the Philadelphia office of the Niles-Bement-Pond Company, Inc.

The Vulcanite Portland Cement Company about May 1 will move into new offices at 8 West Fortieth street, New York.

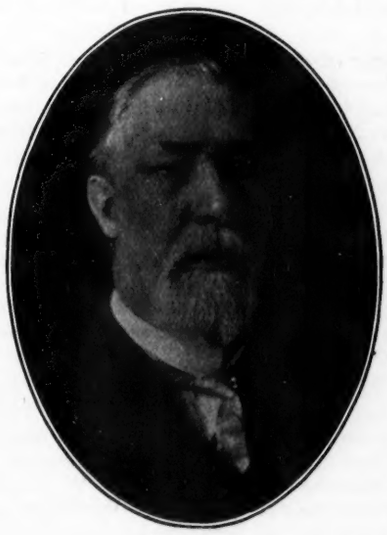
The Taylor Wharton Iron & Steel Company, Philadelphia, Pa., is working on an order for shrapnel shells at its Tioga plant.

The Western Electric Company has moved its Kansas City distributing house into a new warehouse at 608-610 Wyandotte street.

Joseph F. Dixon, Jr., foreign sales manager of the Allis-Chalmers Company, died at his home in Brooklyn, N. Y., on April 30.

The Pyrene Manufacturing Company has moved its head offices in New York to the Vanderbilt Concourse building, 52 Vanderbilt avenue.

George T. Reiss, vice-president of the Niles Tool Works Company, and a director of the Niles-Bement-Pond Company, died at his home in Hamilton, Ohio, on May 5. Mr. Reiss had been in the employ of the Niles Tool Works Company continuously since 1878. He was born in Cincinnati, December 6, 1849. In 1877 he went to Hamilton. He was first employed there as a draftsman, but in 1878 he was given the position of master machinist with the Niles Tool Works Company, and placed in charge of the company's engineering department. He was subsequently chief mechanical engineer and later superintendent of the drafting department. Eventually, he became vice-president of the company and a director of the Niles-Bement-Pond Company. He was an inventor of considerable importance and held a position of prominence in the affairs of the city in which he made his home.



G. T. Reiss

The Brown & Sharpe Manufacturing Company has recently awarded a contract for the construction of a two-story addition to its plant at Providence, R. I.

Charles A. Billings has resigned as manager of the Brooklyn plant of the American Bridge Company, and will devote his entire time to personal interests.

J. W. White, formerly of the Union Switch & Signal Company, has resigned to become special representative of the Electric Cable Company, Bridgeport, Conn.

Charles Spalding, representative of the Gisholt Machine Company, Madison, Wis., in Chicago territory, has transferred his headquarters from the Chicago office to Detroit.

A. W. De Revere has been appointed district sales manager of the Terry Steam Turbine Company, Hartford, Conn., in charge of offices at 524 Monadnock block, Chicago.

The Baldwin Locomotive Works, which is reported to have received a contract for war material, has awarded a contract for

the construction of a large building to be erected adjoining the Eddystone plant.

Paul B. Liebermann, formerly assistant chief engineer of the Sprague Electric Works of the General Electric Company, has become associated with the Hyatt Roller Bearing Company as engineer of tests.

Alfred P. Stewart, who last year purchased a controlling interest in the L. A. Green Equipment Company, steel railroad supplies, announces that he will continue the business under his own name, with offices at 202 Oliver building, Pittsburgh, Pa.

The item in the *Railway Age Gazette* of April 9, page 808, announcing the appointment of a new manager of the Boston branch of Manning, Maxwell & Moore, Inc., incorrectly gave the name of the new branch manager as J. S. Wright. The name given should have been Jos. Wainwright.

Fred A. Geier, president of the Cincinnati Milling Machine Company, Cincinnati, has purchased the interest of Larz Anderson in the Cincinnati Shaper Company and the Cincinnati Gear Cutting Machine Company, Cincinnati. P. G. March will continue as president, and the business will be extended.

E. E. Winship, formerly manager of the Cincinnati branch of Manning, Maxwell & Moore, Inc., has been appointed manager of the Cleveland branch, effective May 1. C. H. Overkamp, formerly of the Conover-Overkamp Machine Tool Company, Dayton, Ohio, has been made manager of the Cincinnati office.

The Davis Manufacturing Company, Milwaukee, Wis., manufacturer of gasoline motors, has closed a contract with the Railway Engineering & Equipment Company, Indianapolis, Ind., for the construction of motors, trucks and underframes for the entire output of railway coaches of the latter company for a period of five years.

P. H. Biggs, sales manager of the Cleveland territory of Manning, Maxwell & Moore, has resigned from that position and has taken an office in the Schofield building, Cleveland, Ohio, under the name of the P. H. Biggs Machinery Company. He will handle machine tools and hydraulic machinery, and represent a limited number of manufacturers in the northern Ohio territory.

The Whiting Foundry Equipment Company, Harvey, Ill., has taken over the foundry equipment business of the Central Iron Works, Quincy, Ill., thereby adding to its line the dust arresters and water cinder mills formerly manufactured by that company. The Whiting Company has retained one of the engineers of the Central Iron Works. It will also be prepared to furnish repairs for Central Iron Works equipment.

The Pittsburgh Steel Car Company recently organized by Pittsburgh capital is planning to erect a plant at Greenville, Pa., which will provide for a capacity of 7,500 steel cars a year. The officers of the company are W. A. Scott, Jr., president; H. B. Scott and L. A. Meyran, vice-presidents; H. W. Best, treasurer; George W. Ramby, secretary, and E. B. Caughey, office manager. The offices are at 512 Ferguson building, Pittsburgh.

The Westinghouse Air Brake Company, in order to fill the portion of the ammunition order recently awarded it by the American Locomotive Company, has erected at its works at Wilmerding, Pa., two temporary buildings, one 65 ft. by 175 ft., and the other 65 ft. by 500 ft., and may also erect other buildings. The necessary machinery is being installed, and it is reported that the company has bought all of the machine tools it will require to fill the order. The company expects to complete the contract in 14 months.

The Pacific Great Eastern Equipment Company has been incorporated with a capital of $3,000,000 and office in Vancouver, B. C., to purchase, hire or manufacture railway cars, locomotives or other rolling stock, deal in rails, contractors' equipment, appliances and tools and to sell or hire the same to railway companies and contractors. The provisional directors are: P. Welch, E. F. White, E. W. Kaufmann, A. H. Sperry and D. C. Pennington, Vancouver, B. C., all of whom are associated with the Pacific Great Eastern Railway.

The Reading-Bayonne Steel Casting Company has recently sold its Bayonne, N. J., plant to the Bayonne Steel Casting Company, and its Reading, Pa., plant to the Reading Steel Casting Company. The Bayonne Steel Casting Company has elected officers as follows: William D. Sargent, president and treasurer, and A. J. Passino, secretary. H. K. Pollard has been appointed sales manager, and Charles Lidstone, superintendent. The officers of the Reading Steel Casting Company are: J. Turner Moore, president; M. G. Moore, vice-president; H. M. Doty, secretary and treasurer; M. G. Moore is also sales manager, and J. Douglas Genger, superintendent. The Reading-Bayonne Steel Casting Company was a combination of these two companies organized about December, 1911.

The Westinghouse Electric & Manufacturing Company which, as noted in last week's issue, page 992, has received a large order for rifles from the British government, has practically completed negotiations for the purchase of the plant and business of the J. Stevens Arms & Tool Company of Chicopee Falls, Mass., and the plants of the Stevens-Duryea Company in Chicopee Falls and East Springfield. The company plans to fill the order at these plants. L. A. Osborne, vice-president of the company, will be in executive charge of the work, and Walter L. Clark, recently vice-president of the Niles-Bement-Pond Company, will be manager of the combined plants in charge of operations. The corporate and commercial identity of the J. Stevens Arms & Tool Company will be retained, and its usual line of rifles will be manufactured. When the war order rush is over the other plants will probably be devoted to the manufacture of the usual line of Westinghouse products.

TRADE PUBLICATIONS

WATER SOFTENERS.—The Kennicott Company is the subject of a 29-page booklet prepared by Elbert Hubbard. The booklet is written in a breezy style and will be found of considerable interest.

DOOR HANGERS.—Catalog No. 12, recently received from the Richards-Wilcox Manufacturing Co., Aurora, Ill., illustrates in detail the line of door hangers, grindstones and hardware specialties produced by this company. The book is thoroughly illustrated and contains 296 pages, including an index.

ARC WELDERS.—The subject of bulletin 1915A, from the Welding Materials Company, Inc., 114 Liberty street, New York, is variable voltage welders. The subject of electric arch welding is dealt with at some length, and a number of illustrations are given, showing its application to locomotive and car work.

NUT TAPPING MACHINES.—Tapper Talks, Nos. 1 and 2 have recently been issued by the National Machinery Company, Tiffin, Ohio, and deal with the National automatic nut tappers which operate on the bent cap principle. Illustrations of the machine at work are included and data given as to the advantages claimed.

INSULATING BRICK.—Good Furnaces Made Better is the subject of the booklet issued by the Armstrong Cork Company, Pittsburgh, Pa., and dealing with the Nonpareil insulating brick for furnaces and ovens. Illustrations and descriptive matter are included concerning the application of this type of brick for various furnaces.

VALVES.—The 1915 catalog, No. 18, from the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa., contains 140 pages, giving in considerable detail descriptive and illustrating matter concerning the various valves manufactured by this company. The valves include a large variety of types for both steam and water service.

POWER PLANT OIL FILTERS.—Bulletin No. 10, issued by The Richardson-Phenix Company, Milwaukee, Wis., is devoted to the Peterson power plant oil filter and accessory apparatus for central oiling systems. A large number of half-tone and line engravings are included, and considerable information is given concerning oil filtration.

CRANES.—Book No. 107, issued by the Industrial Works, Bay City, Mich., illustrates and describes the various crane equipments which this company manufactures. These cranes include wrecking cranes, pile drivers, locomotive cranes, lifting magnets, etc. A section is also devoted to other products, such as pillar and transfer cranes, rail saws, transfer tables and wrecking tools. The book contains 88 pages and an insert containing illustrations of a partial set of Industrial wrecking tools. The printing and illustrations are excellent, a high grade of paper being used.

Railway Construction

ALABAMA ROADS.—The Cedar Lake Mill Company, Brewton, Ala., is building a railroad to Brooklyn, it is said, and has decided to extend the line east to Andalusia, about 21 miles.

BRITISH COLUMBIA & WHITE RIVER.—An extension of time in which to build this line has been granted by the Canadian parliament. The projected route is from Bear Creek, a tributary of the Chilkat river in British Columbia, to White river, thence to the boundary between Yukon territory and Alaska. C. M. Marpole, G. E. MacDonald, G. E. Wilson, A. McDonnell and J. Ironside are the provisional directors. (February 26, p. 389.)

CALGARY & FERNIE.—The Canadian parliament has granted an extension of time in which to build this projected line from Calgary, Alta., southwest to Fernie, B. C. J. R. Lawreym, S. S. Monaham, Victoria, B. C., and A. Mutz, Fernie, are interested. (January 2, p. 50.)

CANADIAN WESTERN.—An extension of time has been granted to this company in which to build from the International boundary in Alberta via Pincher creek, Cowley and along Old Man river valley to the Livingstone mountains, thence to Calgary, Alta., also to build a branch line west to Michel, B. C. The company was incorporated in 1909, and the provisional directors included J. S. Hough, A. S. Kildall, L. L. Metcalfe and O. L. Boynton, Winnipeg, Man. Hough, Campbell & Ferguson, Winnipeg, are solicitors for applicants.

CHARLOTTE HARBOR & NORTHERN.—This company is planning to build an extension, it is said, from Ridgewood, Fla., east to Bartow, four miles, for which surveys are now being made.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has resumed track elevation on its Wilson avenue extension at Chicago, Ill.

ENTWISTLE & ALBERTA SOUTHERN.—Incorporated in Canada to build from a point on the Grand Trunk Pacific, at Entwistle, Alta., south to the Saskatchewan river, about 60 miles. The provisional directors include C. L. Hervey, D. A. O'Meara, Montreal, Que.; T. A. Burgess, L. A. Cote and R. H. Pringle, Ottawa, Ont. (March 12, p. 493.)

FLORIDA ROADS (Electric).—Plans are being made, it is said, to build an electric line from Lynn Haven, Fla., south to Panama City, also to other places. Richard Tillis, Montgomery, Ala., is said to be interested.

GLENGARRY & STORMONT.—It is expected that this line will be open for operation about June 1, from St. Polycarpe, Que., on the Canadian Pacific, southwest to Cornwall, Ont., 28 miles. The Canadian Pacific will operate the line.

GULF, COLORADO & SANTA FE.—This company will spend about $300,000 laying heavier rail and fastenings, and about $25,000 for new turn tables at Gainesville and Fort Worth, Tex. F. Merritt, Galveston, Tex., is chief engineer.

INDIANAPOLIS UNION RAILWAY.—This company has been empowered to issue $4,000,000 in bonds for track elevation work which will eliminate grade crossings by the construction of subways at 11 streets where its track system contains from 2 to 15 tracks. The work will consist of bridges over streets on concrete abutments with earth filling between streets. It will require the rebuilding of the train sheds at the Indianapolis Union station, where there will be 12 through tracks at an elevation of about 15 ft. above street grade. The former grade will be occupied by the baggage rooms, express rooms, etc. The elevation through train sheds will be accomplished entirely on steel structure.

KANAWHA, GLEN JEAN & EASTERN.—This company, which operates an 8-mile line from Glen Jean, W. Va., to Tamroy, has under consideration the question of building a two-mile extension.

KETTLE VALLEY LINES.—The Canadian parliament has granted to this company an extension of time in which to build the following branch lines: From Penticton, B. C., to the International boundary at Osoyoos lake; from Summer creek via Allison or Princeton to the junction of Granite creek with the Tulameen river; from One Mile creek to the Copper mountain and Voigt mining camps, 15 miles southwest of Princeton; from Vernon, southerly via Kelowna to Penticton; also to build from a point on the line to be built from Summer creek northerly to Otter Summit, about 30 miles south of Merritt; from near Tulameen for about 50 miles up the Tulameen river valley, from Grand Forks for 50 miles up the north fork of the Kettle river; from Midway to Hedley, and from Penticton to Nicola. (January 29, p. 211.)

LAKE ERIE & NORTHERN.—The question of carrying out the electrification of the completed section of this line is now under consideration. The company is building between Galt, Ont., and Port Dover via Paris, Brantford and Waterford, 51 miles, and the line has been leased to the Canadian Pacific. The contractors at work from Brantford south to Port Dover expect to complete the work this year, and if the Brantford-Galt section is electrified the southern section will be operated by the same motive power. Martin N. Todd, president, Galt, Ont.

MISSISSIPPI ROADS.—Surveys are now being made, it is said, to build a railway from Yazoo City, Miss., east to Carthage, about 60 miles, and the Yazoo City Council has voted $50,000 in aid of the project. Walter C. Murphy, Chicago, Ill., is back of the project, and R. H. Douthat, secretary of the Yazoo Commercial Club, is said to be interested.

MOUNT AIRY & EASTERN.—Contracts will be let at once, to build a 3-mile extension in Patrick county, Virginia, and an additional extension of three miles is to be built later. The company now operates a 19-mile line from Mt. Airy, N. C., northeast to Kibler, Va. The principal commodities to be carried on the extensions are logs, lumber and farm products.

NEW YORK, WESTCHESTER & BOSTON.—An officer writes regarding the report that the Westchester Northern is to be built in the near future from White Plains, N. Y., northeast to Danbury, Conn., that no definite plans at the present time have been made for the construction of that line.

OHIO ROADS.—The city council of Youngstown, Ohio, has authorized an issue of $800,000 of bonds to pay the city's share of the cost of a separation of grades of the city streets and the tracks of the Erie, the Lake Shore & Michigan Southern, the Pennsylvania Company and the Baltimore & Ohio at four different crossings. In all cases the streets will go over the tracks. At one crossing the tracks of the Erie will be depressed. In all other cases the railroad tracks will remain at the present grades. The elevation will consist of steel structures with masonry abutments, and the cost of the work will be divided between the city, the railroad companies and a traction company. Work will be done by contract and the cost is estimated at about $3,500,000.

PETERSBURG & JAMES RIVER (Electric).—Plans have been made by this company to build an electric line from Petersburg, Va., northeast to City Point, 10 miles. The grading work will be light and there will be very few curves; four small bridges are to be built and one sub-station on the line. J. Walter Long, president; B. R. Walters, secretary and treasurer, 801 Real Estate Trust building Washington, D. C.; J. H. Starkey, chief engineer, Rockville, Md.

RED RIVER & GULF TERMINAL.—Incorporated in Texas with $75,000 capital and office at Longview, Tex. The plans call for building a line from the northern terminus of the Port Bolivar Iron Ore line of the Gulf, Colorado & Santa Fe north through Marion and Cass counties, thence northwest through Morris and Red River counties, Texas, to a point on Red river southeast of Hugo, Okla., about 85 miles. G. A. Bodenheim, T. C. Morgan, R. M. Kelly, L. L. Featherstone, all of Longview, J. Bradfield and R. N. Taylor, Daingerfield, and W. D. Myers, Houston, are interested.

RICHMOND & EASTERN.—Incorporated in Virginia to build from Richmond, Va., east to Ft. Lee, about five miles. J. C. Robertson, K. T. Crawley and C. B. Anderson, Richmond, are incorporators.

ROBY & NORTHERN.—Incorporated in Texas with $10,000 capital to build from Roby, in Fisher county, Texas, north to North Roby, about five miles. The headquarters of the company are at Roby. C. L. White, president; L. C. Eastland, vice-president, both of Hillsboro, and J. C. McWhirter, secretary, Roby, Texas.

SALT LAKE & UTAH.—This company has awarded a contract to

W. M. Smith, Salt Lake City, for the grading on an extension from Provo, Utah, to Springville, 6.5 miles; this work was started on May 1. The track laying will be done by company forces. There will be one 45-ft. trestle.

Toronto Suburban (Electric)—Grading work on the line building from Toronto, Ont., west to Guelph, 42 miles, is now under way on the section from the Humber river to Islington. The western section of the roadbed was constructed last year and rails and ties are now being laid. A new bridge is being built over the Humber river. (December 11, p. 1107.)

Westchester Northern.—See New York, Westchester & Boston.

RAILWAY STRUCTURES

Birmingham, Ala.—An ordinance is being prepared providing for the construction of a new bridge at Twenty-first street, to replace the present structure. The railroads will be required to build the new structure.

Cincinnati, O.—The Cincinnati, New Orleans & Texas Pacific intends to rebuild its bridge across the Ohio river at Cincinnati. Plans are not sufficiently advanced at present to give definite information.

Hempstead, Tex.—The Sunset-Central lines will build a new bridge over the Brazos river to replace one washed out by floods.

Lowell, Mass.—The city of Lowell will build a bridge to have two spans each 150 ft. long over the Merrimac river at Pawtucket Falls, Lowell. The new structure is to cost $80,000, and it will carry tracks for the operation of cars of the Bay State Street Railway Company.

Monett, Mo.—The St. Louis & San Francisco will build a new depot to replace one destroyed by fire.

Morgantown, W. Va.—The Buckhannon & Northern has given a contract to the Crossan Construction Company, Brownsville, Pa., for the excavation of about 15,000 cu. yd. This is part of the work on a new terminal at Morgantown for the Buckhannon & Northern. No contracts for the buildings or tracks have yet been let.

Nashville, Tenn.—Plans are being made by the Freeland-Klyce Engineering Company, Nashville, for a bridge to be built by Davidson county over the Cumberland river at Hydes Ferry. It is expected that the bridge will be designed to carry double track for the operation of electric cars.

Raleigh, N. C.—The Norfolk Southern is putting up a small shed at the Raleigh yards for the protection of workmen in placing steel underframes on cars. The building will be 40 ft. by 60 ft. The company has also provided additional tracks for handling about 75 cars at one time. The cost of the work will be about $5,000.

St. Paul, Minn.—The Chicago & North Western is asking for bids on channel changes, levee walls, sewer extensions and riprapping in connection with the new union station at St. Paul.

Saratoga Springs, N. Y.—Work is now under way putting up a new passenger station, to be of steel, iron and brick construction, for the Hudson Valley Railway Company, at Broadway and Congress street, Saratoga Springs. The station proper will be 72 ft. long and 20 ft. wide; it is expected that the improvements will cost about $40,000.

South Richmond, Va.—In connection with new terminal facilities for the Southern Railway at South Richmond, a contract has been awarded to Alsop & Pierce, Newport News, Va., for the construction of a new oil house to cost $6,975.

Tillsonburg, Ont.—The Grand Trunk is building with its own forces a small station at Tillsonburg.

Men of English Railways with the Colors.—Up to February 26 a total of 12,233 men, or 14.1 per cent, of the staff of the London & North-Western Railway had joined the colors, and up to March 15, 1,058 had met with casualties, of whom 126 had been killed or drowned in action and 45 had died of their wounds. There were 67 missing and 137 were prisoners of war.

Railway Financial News

Baltimore & Ohio.—The Maryland Public Service Commission has approved the issue by the Baltimore & Ohio of $40,000,000 4½ per cent short term notes, of the proceeds of which $35,000,000 will be used to retire notes maturing June 1, and the remainder for expenditures on property account.

Delaware & Hudson.—A statement was made at the annual meeting which took place this week that about $26,000,000 had been put into the property [apparently it was not specified whether it was the railroad property or coal properties] which had never been capitalized, and which did not appear on the balance sheet.

Delaware, Lackawanna & Western.—A committee representing stockholders of the Morris & Essex, which is leased to the Delaware, Lackawanna & Western, has been formed, consisting of P. L. Hoadley, president of the American Insurance Company, Newark, N. J.; Edward Milligan, president of the Phoenix Insurance Company, Hartford, Conn.; George C. Van Tuyl, Jr., president of the Metropolitan Trust Company, New York, and W. N. Williams, vice-president of the Aetna Insurance Company, Hartford, Conn. This committee asks for the deposit of stock and the granting of proxies to be filed with the Metropolitan Trust Company, New York, and in the request for proxies says that it is of the opinion that the additional dividend of 1 per cent annually provided for in the lease should not only have been paid by the Lackawanna to the stockholders of the Morris & Essex for some years past, but should also be properly payable in the future. Legal proceedings have been begun by the committee to enforce this view.

Michigan Central.—H. E. Anderson has been elected a director, succeeding to the vacancy caused by the resignation some time ago of James Stillman.

Morris & Essex.—See Delaware, Lackawanna & Western.

Nashville, Chattanooga & St. Louis.—A. G. Candler has been elected a director to fill a vacancy.

Traffic Through the Panama and Suez Canals.—The following comparative table gives the number of vessels using the Panama and Suez canals for the months of August, September, October, November and December:

	Panama		Suez	
	No.	Net tonnage	No.	Gross tonnage
August	24	106,288	250	1,402,864
September	57	322,038	323	1,721,195
October	84	420,357	479	2,635,446
November	92	448,801	370	2,635,446
December	99	439,915	397	2,451,424

The Belgian Railways.—The Belgian lines have now been completely taken over by the German war office, and only Germans are employed, even the old porters not being allowed at the stations. To obtain a ticket it is necessary to have a special pass from the military police headquarters and before obtaining this permit the applicant has to state not only where he is going, but for what reason and for how long. All these facts are duly noted down on the pass. Only German coinage is accepted in payment for a ticket, Belgian money being refused. Civilian passengers are only permitted to travel in third-class cars, for which, however, they pay first-class fares. Second-class cars and the so-called first-class cars (some of these are only known as "reserved," the first-class proper having vanished in Belgium a few years ago save on international trains) are labelled to show that they are exclusively reserved for military passengers. Before the traveler reaches the station he is searched by soldiers and the train itself is reached by walking a quarter of a mile or so from the station. The carriages are neither lighted nor heated, and passengers are forbidden to look out of windows when crossing bridges for fear they be shot by sentries. To add to the pleasures of travel, a 10-mile journey may necessitate two or three changes, with a wait of several hours on each occasion.